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A TEXT-BOOK

OF

PRACTICAL THERAPEUTICS,

WITH ESPECIAL REFERENCE TO THE

APPLICATION OF REMEDIAL MEASURES TO DISEASE

AND THEIR

EMPLOYMENT UPON A RATIONAL BASIS.

BY

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1890

THIS VOLUME

IS DEDICATED TO

DR. J. WILLIAM WHITE,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA,

AS AN

EVIDENCE OF FRIENDSHIP AND ESTEEM,

BY

THE AUTHOR.

27613

PREFACE.

THE object of this book is to provide the physician or undergraduate student of medicine with a reliable guide in the study of Therapeutics, or the application of remedial measures for the cure of disease. It has been written because, in the belief of the author, most of the text-books on this subject treat of it as if the student was already a skilled physician or experimental pharmacologist. As a consequence, two classes of undergraduate readers exist. One finds that the mixture of science and empiricism is too difficult for him to fathom, and is hopelessly confused; the other simply learns the remedies and doses by heart and gives drugs with little idea as to what they are to do. Further than this, the physician is often at a loss to decide when a remedy is indicated, even though his theoretical knowledge of the subject be very thorough. Thus, he is told that ammonium chloride is a remedy in bronchitis, but the exact stage at which it is to be employed is often not stated, or he knows that digitalis does good in cases of cardiac disease, but fails to recognize the fact that it is only when compensation is lacking that the drug is needed. For this reason Part IV. has been written, not with the object of providing a rigid system for treating disease, but rather for the purpose of bringing together the best remedies, and of showing how and why they are given.

Rational therapeutics at the present day does not consist in a knowledge of doses and the materia medica, but exists as a complex art in which knowledge and its proper application, based on common-sense principles, go hand-in-hand. The treatment of "symptoms as they arise" by the employment of remedies recommended by some eminent authority is a variety of empiricism whose existence has depended largely on the fact that many physicians of the past have either been so ignorant as to be led where a writer willed, or so slothful as to be willing to let others think for them. Scientific research has so largely opened up to everyone the possibility of using drugs with a distinct idea of the reason for their employment, that the writer has endeavored to bring together in a readable form the combined results of laboratory and bedside experience, thinking the time ripe for such a task. It is true that several other books give, in a more or less thorough manner, a *résumé* of the physiological action of the drugs of which they treat, but in even the best of them only the most trained student of pharmacology can discover the close relationships which exist between the results reached by the physiologist on the one hand and the clinician on the other. The two parts of the study are usually so divorced by the prolonged mental effort necessitated by the arrangement of the text, that the student either ignores the physiological action for the sections on therapeutics or crams the former to pass an examination required by the teacher whose course he must follow. As a consequence, too many physicians regard pharmacology simply as a species of mental training, or believe it to be a waste of time and energy. No one can think that the writer of this book will ever deny the value of original research or bedside experience, but he does desire to weave science and practice into so close a network that the foundations of experience may be cemented by the mortar of exact knowledge. In some instances, however, science and practice seem to be absolutely opposed and only future research can explain the apparent contradiction.

Throughout this book, in every part where drugs or diseases are considered, the writer has arranged the titles in alphabetical order, according to their English names. This has been done because it is desired to afford the reader a ready-reference book to which he may turn at short notice for desired information, for at present the state of pharmacology is so unsettled that a true classification is impossible. Thus, morphine may be classed by one writer as a nervous sedative, by another as a sleep-producer, by a third as a bitter substance, and by a fourth as a respiratory depressant. Bromide of potassium can, with equal propriety, be called a spinal sedative or a cerebral sedative, or caffeine be classed as a cerebral stimulant, a circulatory stimulant, or a diuretic.

In order to make the book more complete, the preparations of the British Pharmacopœia have been introduced; and with the same object in view, a dose-list of drugs, both officinal and unofficinal, has been appended for ready reference. The subject of medical electricity has heretofore commonly found a place in most text-books on therapeutics, but has been advisedly omitted in this instance, since electrical therapeutics has outgrown any work save one devoted to that subject alone.

For many of the articles on treatment the author wishes to thank friends who have earned prominence in connection with their specialties. Thus Dr. G. E. de Schweinitz has contributed the articles on the treatment of diseases of the eye; Dr. Edward Martin those on the treatment of venereal diseases and on antisepsis; Dr. Barton C. Hirst those on the treatment of diseases of the puerperal state; and Dr. J. Howard Reeves, the articles on the treatment of diseases of the upper air-passages. All of these articles enhance the value of the book to so great an extent that the author feels sure they will be sought out and read with interest.

In addition to the general index, a copious and explanatory index of diseases and remedies has been appended, which will prove suggestive and valuable to practitioners, and for which the author is indebted to his friend and student, Mr. J. G. Clark.

PHILADELPHIA, 222 SOUTH FIFTEENTH STREET.
SEPTEMBER, 1890.

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PART I.

GENERAL THERAPEUTIC CONSIDERATIONS.

Before entering into a study of the action of drugs upon the living body, it is necessary that the student possess a clear idea of what the word "therapeutics" means, the reason why we resort to drugs, and, more important than all, that he grasp the limitations which govern the administration of remedies. Two very foolish and unfounded ideas have recently been put forward by certain physicians—namely, that medical therapeutics is useless, and that this branch of medical knowledge is not advancing with as great a stride as pathology or surgery. The individuals who laugh at the general use of drugs in disease belong to one of two classes—either they have never tried them, or if so have used the drugs ignorantly or wrongly, or they believe that they are promulgating a new theory, and do not know that both the era of excessive doses and nihilism are relics of the past. No reform has ever yet attacked a crying evil without becoming excessive and absurd itself, and, if successful in accomplishing its object, has generally resulted not in the mere relief of the existing faults, but caused so complete a reversal of popular opinion as to force its converts into foolish ways as uncalled-for as their first acts. In exactly the same manner that the excesses of Catholicism resulted in fanatical Puritanism, so did the careless methods of physicians during the past century lay the foundation for the growth of homœopathy or therapeutic nihilism. At the present time, although we have much to learn, it can be said that we have benefited by both of these errors, and are in consequence taking the path which may be considered a happy medium.

To the majority of the readers of this book the harmfulness of over-dosing is evident, and the cry of "no drugs at all" is so absurd, that no rebuttal need be offered.

The statement that therapeutics is more backward than pathology and surgery is readily answered and denied, for the therapeutist is able to treat successfully many diseases of which the pathologist knows nothing, and is obliged to rest his treatment on empiricism simply because he cannot tell how his drugs act if the pathologist cannot tell him what the disease is. Rheumatism is a good example of this very point.

In regard to surgery, every one must recognize the extraordinary advances made in this branch of medical science, yet comparatively few realize that it is solely by the introduction of drugs that all these triumphs are possible. The definition of the word "therapeutics" in Billings's *Dictionary* is "that branch of medical science which treats of the application of remedies to the cure or alleviation of disease," and practically the term is universally used to signify the employment of drugs for such purposes. The credit for the introduction of new instruments may or may not be accorded to surgery, but the invention of new drugs must be accorded to therapeutics. We find, then, that ether and chloroform began to revolutionize surgery fifty years ago, and that corrosive sublimate, carbolic acid, and other drugs have revolutionized it once more in the lifetime of every one who reads this book. Cocaine has changed the entire face of eye surgery and other minor operations, and has immediately put aside an enormous amount of pain and suffering which the surgeon could not relieve, or at most remove, unless its influence was present. To the accusation of backwardness the therapeutist can well ask any part of medical science to put forward one discovery which equals antipyrine or acetanilide in power in the relief of disease or pain, or which can be applied to so wide a scope of ailments as specifics.

In the language of one of the most progressive medical men ot to-day in the United States, the man who does not believe in the proper use of drugs for the cure of disease must lack the very keystone of the arch upon which rests all medical knowledge.

The ultimate aim and object of all medical thought and effort is the cure or alleviation of disease, and therapeutics is the refined product culled from every part of medical learning. Like every other thing requiring a thorough knowledge of its component parts, it is often much abused by the careless and ignorant, but is a power for good in the trained hand of the well-educated physician.

Further than this, therapeutics is the only universally used branch of medicine in existence, for each and every branch resorts to it, and the most skilful operator who fails to treat his cases medicinally with equal skill has worse results than the man who bungles, but uses drugs intelligently after his slashing is finished.

MODE OF ACTION OF DRUGS.

Drugs act in two ways, which are sometimes called near and remote, direct or indirect. The near or direct action of a drug is that influence which is felt by the exercise of its effects directly upon the tissues with which it comes in contact; the indirect or remote influence is that result which comes as a sequence of its primary effect. As an illustration of this we may take the local use of cantharides. The local, near or direct effect of this is a blister, the remote or indirect effect is the absorption of exudations or the influencing of inflammatory processes. If pilocarpin is used its direct effect is the sweating which ensues, while its indirect effect is the relief of dropsy.

MODES OF ADMINISTERING DRUGS.

Drugs may be used to affect the general system in many ways, but practically we only employ six methods, as follows:

1. By the mouth or stomach.
2. By the rectum.
3. By inhalation.
4. By hypodermic injection.
5. By inunction.
6. By the endermic method.

By far the most usual manner of administering drugs is by way of the *mouth*, which is the most natural means of entrance into the body for foreign substances. Whenever medicines are used in this way, the physician should clearly bear in mind what the medicine is to do after it is swallowed. Thus, if the drug is intended to act directly upon the stomach it should not be given after meals, but a little while before, since the food and gastric juice may afterward so cover the gastric mucous membrane that the medicament cannot act. Thus, in the case of chronic gastric catarrh or gastric ulcer the nitrate of silver which is used should always be given half an hour before meals. On the other hand, if an ulcer or other trouble exist in the small intestine, the pill should be given some time after meals, and if a heavy meal is taken, three or four hours after, since under these circumstances the medicine is swept out into the intestine almost at once, without remaining any time in the stomach where it may be chemically altered. Very often it is necessary to give a medicine after food is taken, in order that it may not act in too powerful or concentrated a manner upon the viscus which receives it.

The general rule, however, may be laid down that all medicines are to be taken after rather than before meals unless a local gastric effect or very rapid absorption is desired.

When drugs are given by the *rectum*, we employ them for three purposes. Namely, to influence the general system by their absorption, to act locally upon any disease which may be present in this particular locality, and, finally, to dislodge substances or parasites which it is desired to bring away. The word enema is loosely used to denote all these injections, be their purpose what they may, and is synonymous with "rectal injection" or the more old-fashioned word clyster. If nourishment is being given the injection is called a "nutrient enema." Sometimes these injections are called lavements.

It is very necessary that the physician should use his medicines in such an instance in proper bulk, and it may be laid down as a rule that no more liquid should be injected than is necessary to carry the medicine or food unless the injection is for the purposes of emptying the bowel of fæcal matter or other materials, or it is desired to distend the colon to overcome obstruction or to influence chronic colitis.

The reason for this lies in the fact that any large bulk of liquid sent into the rectum so stimulates its walls by distention as to cause spasmodic contraction and expulsion of all the rectal contents, which is just what is needed where fæcal matter is to be removed, but the opposite of what is desired where retention is necessary for absorption or local action of a remedy or food. In rectal catarrh or ulcer two to four ounces of liquid are usually sufficient in an adult to accomplish any medicinal influence locally or by absorption, while one to two pints may be employed as a laxative enema.

In the use of injections we frequently find that the rectum becomes irritable, and at once resists all efforts to force the entrance of liquids or solids. This is to be avoided by giving the injection so gently that the bowel fails to recognize the entrance of liquid and by the introduction of a few drops of oil and laudanum in each injection.

Suppositories are another means by which we introduce medicines into the bowel for local effect, or to act after absorption of their contents upon the general system.

When drugs are given by *inhalation* they are generally employed with the object of affecting the respiratory tract alone, although there are notable exceptions to this in ether, chloroform, nitrous oxide gas, and other volatile substances. Aside from anæsthetics, we find that remedial measures may be taken by means of steam laden with the drugs employed, by the respiring of air loaded with the fumes of the medicament, or by the inhalation of gases. Last, and most commonly resorted to of all, we find the atomizing spray, which, if properly made and employed, so minutely divides the liquid containing the medicine that the inspired air carries it to the furthest bronchiole and pulmonary vesicle.

As examples of the rules governing the administration of drugs in this manner, we find that compound tincture of benzoin may be taken by inhaling the steam arising from hot water containing it, but cannot be used in a spray because it occludes the fine points of the tubes. In a similar manner we inhale the smoke of belladonna or tobacco leaves to relieve asthma, or the fumes of chloride of ammonium for bronchitis in its later stages. Finally, we find that oxygen is an exceedingly useful gas, readily inhaled with good results in proper cases.

The spray or atomizer as used is made in a number of forms; one class being worked through the agency of compressed air, the other through the escape of steam from a small boiler. Very few of the compressed air atomizers throw a fine enough spray to reach the lower parts of the lung, particularly if the air is compressed by the hand.

The inhalation of moist air is very useful in bronchitis, and greatly aids other measures directed to its cure. Steam may be disengaged in the room by means of a boiling kettle, or by placing pieces of unslaked lime in a pan of water.

Next to the use of drugs by the mouth, by far the most popular method is their administration by means of the *hypodermic needle* and syringe. The logic of this method rests upon the absorption of all soluble substances from the cutaneous tissues with great rapidity. Any substance soluble enough or suspendable enough to pass through a hypodermic needle without forming an obstruction may be employed, provided it is not too irritating and is clean.

The proper places to give such injections are the forearm, on either surface, the calf of the leg, the buttock or the broad of the back, or, in other words, any spot where the tissues are not dense and unyielding. The skin of the part is to be grasped or pinched up with the thumb and forefinger of the left hand and the needle sent well into this raised fold, preferably above the finger and thumb, so that the pressure of these two may prevent pain and the too rapid entrance of the medicine into the system. The needle should always penetrate well into the loose connective tissue so that the liquid injected may find lodgment in the loose and spongy subcutaneous tissues without separating the skin from its rather close adhesion to the tissues below and to the bloodvessels supplying it, which if done may result in abscess and a slough.

The dangers from hypodermic injections are chiefly two: First. The medicine may enter a vein, owing to the penetration of the wall by the needle, and the entire dose be taken at once, *en masse*, to the vital centres. Second. The solution used may not be sterile or the needle dirty, and an abscess may result. The first danger is to be avoided by injecting into spots not well supplied with veins, and the second by thoroughly washing both the syringe and needle with water the instant that they are used, pushing a fine wire through the needle and in some cases by soaking it in carbolized oil. Further than this, the liquid injected may be rendered sterile by using freshly boiled water and adding thereto carbolic acid in such proportion that half to one drop of carbolic acid is present in each injection. Most hypodermic syringes hold from twenty to thirty minims.

tibility to various remedies, that we call *idiosyncrasy*, creeps in as an important factor in the decision as to the dose which should be given in each case. By far the nearest approach which we can make to absolute accuracy in dosage, is to use drugs according to the weight of the patient, but this method possesses the disadvantage that we cannot always weigh our patients, and that the presence of a large amount of fat or of dropsy will make an unknown quantity in our calculation as to the true weight of the active part of the individual.

At present we are accustomed to be governed by a list of doses which is given to all adults within certain limitations, and which are varied sufficiently to allow great difference in the effects obtained, and it is in this very point that the success of many a physician chiefly rests, for the use of a dose by rule of thumb is as empirical and lacking in thought as is the use of a remedy, not because we have a definite action for it to carry out, but because it did some one else good who was suffering from what appears to be a similar attack. The dose must be varied to fit the case in the same manner that the cut of a coat must be varied to fit each individual.

There are a number of rules in regard to the doses which are given to children, the best of which is Young's rule. This is as follows:

Add 12 to the age and divide by the age. Thus, if a child is 2 years old, we have the following fraction: $2 + 12 = 14, \div$ by $2 = 7$ or one-seventh of the dose for an adult is the dose for a child of 2 years. This rule is not a law, however, for of narcotics children receive less than this (one-half), and of purgatives or laxatives more than this (two or three times).

When drugs are given hypodermically the dose should be generally one-half to one-quarter of the dose by the mouth, and if any thought of idiosyncrasy exists, the dose should be smaller still at the start, provided powerful remedies are to be used.

By the rectum the dose should be twice the amount given by the mouth, unless the drug be very powerful.

IDIOSYNCRASY.

This is one of the most interesting portions of the study of the action of drugs, a frequent cause of disappointment to patient and doctor, and an equally frequent cause of excessive action from what the physician has thought to be a moderate dose. No rule can be laid down for the discovery of its existence in a given case, except that females, particularly of the hysterical type, are more subject to idiosyncrasy than males, although certain men often present marked evidences of this tendency. No better illustration of idiosyncrasy can be adduced than the case which is appended, nor than that of a friend of the author, who cannot eat a strawberry without suffering from a violent attack of hives.

The other case is that of a woman of thirty years, suffering from severe headache, who received an eighth of a grain of the muriate of pilocarpin, hypodermically, every twenty minutes, till nearly three-fourths of a grain was taken, without any evidence of its action either in salivary flow or sweat. But the tolerance of drugs did not stop here. Twenty drops of tincture of cannabis indica every four hours failing to relieve the pain, half-grain pills were ordered of the solid extract of the drug which was known to be reliable, two of which commonly affect a grown man most markedly. In order to avoid any failure in absorption the pills were cut in half before they were given, and forthwith administered, one every three hours, without any effect after ten had been taken. Twenty more of the pills from the same manufacturers, but from a different retailer, were now given, one every hour, with the exception of a few irregularities in administration in the night, the entire twenty being swallowed between four o'clock one afternoon and two o'clock on the next afternoon. The thirty pills (15 grains) were taken in less than forty-eight hours without producing a single physiological sign of the slightest character.

That the doses were really swallowed would seem to be undoubted for their administration was carried out by a trained attendant, and their black color forbade their expulsion on the bed from the mouth without attracting attention. The hypodermic injections were given by the author, and as the solution was made as fast as it was used, the patient must certainly have received all of the pilocarpin.

As there was daily an afternoon rise of temperature amounting to several degrees, quinine bisulphate was ordered in the dose of fifteen grains to be given after six powders of one-sixth of a grain of calomel had been taken; this not only failed to control the fever but also produced no buzzing in the ears. The writer was now inclined to consider all the symptoms as hysterical, even including the evening rise of temperature.

Twenty-four hours after the last dose of cannabis indica, the attendant gave the patient, without orders, no less than sixty grains ot antipyrine in sixteen hours without any physiological symptoms, and, under orders, she took from forty to fifty grains of bisulphate ot quinine every day for three days without any signs of cinchonism.

Wide experience has taught us, however, that several conditions act fairly constantly in regard to some idiosyncrasies. Certain diseases—such as peritonitis or pain—allow large doses of opium to be given, or in lead-poisoning and paralysis patients may require enormous doses of active purgatives to move the bowels.

The *climate* in which the patient lives, or has been accustomed to live, renders him more or less susceptible to certain remedies. Thus the East Indian runs amuck after eating hasheesh or cannabis indica, or the Chinaman goes into a delightful dream-land from smoking opium, whereas the Anglo-Saxon experiences no such agreeable sensations as a general rule. Southerners generally require larger doses of purgatives than Northerners, oftentimes because their livers are not as active.

The *temperament* of an individual is also a highly important matter to be considered. It is a notorious fact that phlegmatic dark-skinned persons usually yield to drugs less readily than blondes and nervous persons, more especially in respect to the drugs which act on the nervous system. Nervous light-haired women stand belladonna very badly as a general rule, while children will take large doses often without discomfort. Opium is usually badly borne by children.

Habit is another important fact governing idiosyncrasy. We all know how rapidly one becomes accustomed to tobacco, and how morphine *habitués* take enormous amounts of their favorite drug without effect.

ABSORPTION OF DRUGS.

The knowledge of the rapidity with which certain drugs are absorbed from the various surfaces with which they come in contact, is of importance in order that we may know when to repeat the dose if the first amount does not produce the desired effect. The rapidity of absorption depends upon a number of factors. If the circulation is active absorption is active, but if it be depressed absorption is slow. Thus, in a person apparently drowned, absorption may not occur at all until the vital functions are restored, and repeated doses given to the patient while unconscious, acting together in the end, poison him. This is often the case in delirium tremens where hypodermic injections of morphine are given, or when it is administered by the mouth. In dropsy absorption is peculiarly slow, and the drug may remain in the tissues for days, only to be absorbed with the exudation after severe purgation, or profuse diuresis or tapping. In general dropsies hypodermic medication is nearly always worse than useless.

When the stomach or rectum is empty absorption is rapid, but when they are full it is very slow. For this reason we find the popular idea that a glass of whiskey when a man is hungry makes him drunk, whereas twice the quantity after dinner does not do so.

Drugs in the stomach or bowel have no influence over the general system unless they are irritants. They only act when taken into the blood or lymphatics.

DURATION OF ACTION OF DRUGS.

The duration of action of drugs depends partly upon their rapidity of absorption, but chiefly upon the rapidity of their destruction in the body, or their elimination. Thus, volatile substances such as ether, chloroform, and nitrite of amyl, act only for a short time and are quickly eliminated, whereas bromide of potash and digitalis act over many hours, and are slowly eliminated in one case or oxidized, as in the second instance. Again, if curare is given hypodermically it will cause paralysis, but if taken by the stomach in moderate amount will be eliminated by the kidneys as rapidly as it is absorbed, and produce no effects if these organs are active. From studying the rapidity of the elimination of a drug we learn how often to order a dose. Thus, digitalis may be given once, twice, or thrice a day, but carbonate of ammonium ought to be used every two or three hours.

Whenever a drug is eliminated slowly and the physician is not careful in its use, it may suddenly develop so severe an effect as to cause alarm, owing to the accumulation of the poison in the body. This is called "cumulative action."

INDICATIONS AND CONTRA-INDICATIONS.

The indication for a drug is any symptom or series of symptoms which we know the drug will relieve without causing at the same time any evil effect to be felt by other parts of the body. A contra-indication is any coëxisting state or tendency which will be made so much worse by the drug as to forbid its use. Thus, one might be tempted to give quinine in meningitis for the fever, yet this would be bad therapeutics, since quinine would be contra-indicated, as it would make the meningitis worse.

Cardiac stimulants are contra-indicated in the presence of arterial excitement, and indicated in arterial depression.

Cardiac sedatives are indicated in arterial excitement, contra-indicated in arterial depression.

Nervous stimulants are contra-indicated in nervous excitement, indicated in nervous depression.

Nervous sedatives are indicated and contra-indicated in a reverse manner to nervous stimulants.

Astringents are contra-indicated as a rule in acute inflammations, as most of them are irritants when applied profusely. The exceptions to this rule are the salts of lead and silver and bismuth subnitrate, all of which are sedative astringents.

Tonics are indicated in instances of local or general systemic depression, contra-indicated in cases of inflammation or excitation with excessive functional activity.

Alteratives are indicated where cell-growth is active to excess, but contra-indicated where tissue break-down is present, or there exists a tendency thereto.

Emetics are indicated when we wish to unload the stomach of undesirable materials, or when we wish to cause an increased flow of bile from the gall-bladder, which is accomplished by the pressure exerted upon this viscus at the time that the abdominal walls and diaphragm contract in retching. Where the ducts are mechanically obstructed with a gall-stone emetics are dangerous, as they may cause rupture of the gall-bladder.

Sometimes we are able to rid the lungs and stomach of mucus in bronchitis or gastric catarrh by emetics.

The contra-indications are cerebral congestion or meningitis, as well as gastritis, gastric ulcer, advanced pregnancy, and hernia.

COMBINATION OF DRUGS FOR A JOINT EFFECT.

The study of the physiological action of drugs has aided us very greatly in improving our therapeutic measures. Thus we now know that chloral is a heart depressant and cannot be used in very full doses, or pushed to produce sleep in persistent insomnia without grave danger, whereas morphine, which also produces sleep but does not depress the heart but does depress the respiration, can be combined with it, and the two acting together, each in small dose, produce a heavy sleep, although so little chloral is present that the heart is safe, and so small an amount of morphine is used that the respiration does not suffer.

Another example of this is found in certain purgative pills where the purgative agent is assisted by belladonna, which relaxes muscular spasm, and nux vomica, which acts as a tonic to the alimentary tract, all the drugs combining to accomplish one result.

Skill in the combination of drugs, not only for increased physiological effect but also for the purpose of making their administration pleasant to the taste, has much more to do with professional success than is generally supposed. This is particularly so in regard to children, for parents dislike forcing their children to take doses which they themselves regard as horrible, and they are ever ready to believe that as long as a medicine tastes good it is better than one which tastes otherwise.

The medical practitioner who prescribes ever so wisely and appropriately for a patient, but who is utterly regardless as to his combinations of drugs so far as taste is concerned, will sooner or later see a more ignorant man take from him that practice which his greater wisdom entitles him to, but which is driven from him by his own errors in this matter.

While in some cases there is no alternative but to give a bad dose, in others a little thought and care will often avoid offending the taste of the patient.

PART II.

DRUGS.

ACACIA.

Acacia, U. S., or Gum Arabic; *Acaciæ Gummi, B. P.*, Gum Acacia, is a gummy exudate appearing on the stems and branches of small trees known as *acacia vera* and *acacia senegal* or other acacias growing in northern Africa and Australia. As sold in the stores it consists of irregular semi-transparent lumps either smooth or angular, according to whether the exudate has been preserved in beads or broken by handling. The color is slightly yellow or almost white, the transparency and color depending largely on the amount of impurities contaminating it.

It is devoid of physiological action.

Therapeutics.—Acacia is employed in medicine as a local application to *inflamed* and *irritated mucous membranes*, particularly of the upper air-passages, and in the form of a drink in these states. In instances where *genito-urinary irritations* exist it is useful as a vehicle for more powerful remedies. Made into a mucilage with flaxseed, to which liquorice may be added, it is largely employed to loosen a hacking *cough* in children and adults. The flaxseed should not be boiled, but allowed to stand on a moderately warm part of the "range," and the gum arabic solution added with a little lemon juice for flavoring purposes. Acacia is chiefly used in pharmacy for making pills, emulsions, and similar preparations, and is officinal in the form of the *mucilage* of *acacia* (*Mucilago Acaciæ, U. S.* and *B. P.*); and the *syrup* of *acacia* (*Syrupus Acaciæ, U. S.*),the first containing 34 parts of acacia and 66 parts of water, and the second 25 parts of the mucilage to 75 of simple syrup.

ACETANILIDE, OR ANTIFEBRIN.

This substance, originally employed in medicine by Hinsberg and Kast, is a white crystalline material only slightly soluble in water but completely soluble in alcohol and ether. Applied to the tongue it causes a burning sensation which is not very severe. It has been known to chemists for many years, and is made by the action of glacial acetic acid upon aniline, forming in this way acetanilide or phenyl-acetamide. The word *antifebrin* is a trade-mark, and should not be used by the profession, since its employment forces the druggist not to use the acetanilide made by chemists, who are able to make the drug as an ordinary chemical compound, and do not charge so high a price as those holding control over the trade-mark name.

Physiological Action.—Acetanilide has been studied experimentally and chemically to a very great extent, and fairly definite outlines of its action have been arrived at.

NERVOUS SYSTEM.—On the nervous system acetanilide has been found to act as a powerful sedative, the sensory part of the nerves and spinal cord being particularly quieted. In poisonous dose general anæsthesia comes on with total loss of reflex action and motor and sensory paralysis. The portions of the nervous system involved in these changes are primarily the sensory side of the spinal cord and the sensory nerves, the motor apparatus being least affected. The muscles are not influenced by the poison except indirectly.

CIRCULATION.—On the circulation antifebrin has but little direct influence except when it is used in poisonous dose. Applied to the frog's heart it at first increases its rate of beating and its force, but soon causes a weakening, ending in arrest in wide diastole. Upon the higher animals it causes in toxic dose an immediate fall of arterial pressure with a diminution in the size of the pulse-waves and all the evidences of cardiac and circulatory depression, notwithstanding the fact that death ensues from respiratory failure. The cause of this fall of blood-pressure is a direct depressing action on the heart associated with failure of the vaso-motor system, as asphyxia causes no rise in pressure.

In medicinal dose it causes no circulatory changes of any moment. Sometimes the pulse-rate is increased, sometimes diminished. The tendency is, however, rather toward depression than stimulation.

BLOOD.—The action of this drug upon the blood is more prominent than its influence upon any part of the body, causing this tissue, when used in large doses, to become brownish-red, decreasing its ozonizing and oxygen-carrying power, and, finally, reducing the hæmoglobin to methæmoglobin to a very considerable extent. The question as to its influence upon the corpuscles is still somewhat undecided, some observers stating that these bodies are disorganized, while others assert that they remain intact. In moderately large poisonous doses it may not affect the corpuscles, but if its use in large amount be maintained for some days, or a single very large one is used, corpuscular destruction certainly occurs, free hæmoglobin being set free in the urine. The normal alkalinity of the blood is decreased and the urine becomes dark and brownish in color, so that the blood crystals of Teichmann may be found in it. In medicinal doses the blood shows no changes except in cases where idiosyncrasy is present or the doses are excessive. Under these circumstances the blood becomes slightly more blue than normal in the arterial system.

RESPIRATION.—No effect is produced upon this function in moderate doses. When poisonous doses are used the breathing at once becomes rapid and then impaired and labored. Large doses produce death by paralysis of the respiratory centre. The causes of these changes are, primarily, the alterations in the blood which so influence oxygenation of the tissues as to lead the respiratory centres to greater effort, while at the same time they are beginning to be directly depressed by the drug itself, so that impairment of their function soon asserts itself. Bokai asserts that the drug paralyzes the peripheral motor nerves, which, if true, brings forward a third factor in the respiratory failure.

TEMPERATURE.—Acetanilide, when given in full medicinal doses, lowers normal bodily temperature or else fails to produce any change. In poisonous doses it produces a decrease in temperature depending on the amount employed, and may produce collapse and rigors. On a fevered temperature it acts as a powerful and fairly constant antipyretic, lowering the fever by *decreasing heat-production* and *increasing heat-dissipation*, the production being the function most affected.[1] Whether the decrease in heat-production is due to an action on the heat-centres of the nervous system or upon other causes is not positively known. Some investigators have claimed that the fall depends upon the partial reduction of the hæmoglobin of the blood whereby less oxygen is carried to the tissues and less combustion ensues. This seems doubtful in view of the fact that the most careful spectroscopic examination of the blood fails to show any such change. That the fall of temperature is not dependent on the sweat produced is proved by the fact that the temperature falls even if enough atropine be given to stop all perspiration.

KIDNEYS, TISSUE-WASTE, AND URINE.—Much contradictory evidence exists in regard to the changes in these organs and excretory products, but most observers agree that the excretion of urea is increased, and it is also true that the more laborious researches reach this result. (Lepine, Chittenden and Taylor.) Less uncertainty exists as to its influence on uric acid, which is increased rather than diminished by the drug. After excessively large doses the urine becomes dark from the presence of broken-down blood.

ELIMINATION.—The drug is eliminated by the kidneys in the form of para-amido-phenol-sulphate.

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[1] The conclusions of Evans and of myself have been severely criticised by H. C. Wood, but my reasons for holding to the opinions stated can be found in my essay on Antipyretics, Philadelphia, 1890.

Antiseptic Action.—The drug possesses some slight antiseptic powers, but they are only asserted when the amount present is quite large.

Toxic Changes from Prolonged Use.—Although it has been claimed that no untoward effects result from the prolonged use of antifebrin in large doses, there can be no doubt that this is untrue. Under these circumstances congestions of the liver, kidneys, and spleen occur, and if the doses be poisonous clots fill the cardiac cavities.

There may be also a progressive decrease in the number of the red blood-corpuscles.

Poisoning.—In man the lips become blue, the face livid, cyanosed, and expressionless or anxious. The forehead and cheeks are covered by beads of sweat which gradually cover the rest of the body. The pulse is soft and compressible, but slow and finally very weak. The respirations are slow and shallow.

The treatment should consist in supporting measures, the use of stimulants, external heat, belladonna to maintain blood pressure, strychnine to aid the respiration and oxygen inhalations if they are necessary to overcome cyanosis.

Therapeutics.—The employment of the drug acetanilide in fevers must depend very much upon the exact condition of the patient and the form of his disease. As has already been pointed out, the mere presence of a malady, or of a high temperature, cannot, correctly speaking, be an indication for any particular remedy. The phase of the disease must be recognized and the question as to whether the fever which is present is harmful, must be duly weighed.

In typhoid fever the studies of most clinicians show that though the drug possesses very decided antipyretic power, it often causes great depression and collapse, and in no way influences the duration or general course of the disease.

For the same reasons the value of acetanilide in phthisis is doubtful, since, although it greatly affects the temperature, it is very apt to cause collapse, profuse sweating, and depression. Thus the writer has seen cases of phthisis where the attempt to control the fever resulted in the manner named, and Riese points out, what the author also noted, namely, that in this disease cyanosis is very apt to come on after the use of the drug.

In regard to the employment of acetanilide in sthenic fevers, it at once becomes evident to the most careless student of medicine, that a drug absolutely unsuited to a case of asthenic disease may, on the other hand, agree with a scarlet fever patient very well. In consequence of this, we find that the sweating of acetanilide is not so marked or troublesome in diseases of a dynamic type, and that, in consequence, it more rarely causes collapse.

In much the same manner as antipyrine was found, some time after its introduction, to be possessed of pain-relieving power, so acetanilide has also been discovered to possess similar properties, a discovery the credit of which must be given to the French investigator Lepine, who has written upon this subject, at various times, very extensively. Almost every form of nerve pain seems to indicate its employment, and it has been successfully used in the crises of *ataxia*, the agonizing dartings of *gastralgia*, and even in *chorea*, with good results. In a corresponding manner Secretan has obtained brilliant effects in cases of *sciatica*, and Silva has seen the most obstinate *headache* yield to its influence. A large amount of experience has proved it of value in *epilepsy*.

The employment of acetanilide in *rheumatism* may be separated, if desired, into that devoted to the cure of the disease with the relief of pain, and the reduction of pyrexia. There can be no doubt whatever of the ability of the drug to control the fever of this disease, and the question as to whether it favorably influences the progress of the malady is to be anwered very forcibly in the affirmative (see Rheumatism).

Acetanilide has even been recommended as an hæmostatic in *epistaxis* and *hæmoptysis*. The dose for cases of *rheumatism* should be 4 to 6 grains three times a day.

Untoward Effects are not very common if acetanilide be used with care. The writer has collected a number of cases (38) in which unfavorable signs appeared after its use, but untoward action was never seen unless the dose given was excessive for the case in hand. The dose most commonly producing such symptoms was from 3 to 10 grains. In only three instances did death occur, one from heart-clot and two from *excessive* dosage. No deaths are reported from moderate amounts, although some of the cases were very alarming.

Administration.—Acetanilide may be given in doses varying from 2 to 10 grains, the last-named amount being usually far too much. As it is virtually insoluble in water, it should always be administered in wine or spirit, in which it will dissolve, or in capsules or pills. Where neuralgias are to be treated, or similar forms of pain are present, mono-bromated camphor, in the dose of ½ a grain, may be combined with acetanilide with advantage.

ACETATE OF POTASH.

Potassii Acetas, *U. S.* and *B. P.*, is a neutral white salt of saline taste, readily deliquescent and soluble in water. It was at one time very largely used in the treatment of *rheumatism* in the "alkaline method," but has been supplanted by the salicylates. If used, 1 ounce to 2 ounces a day must be taken. A combination of 10 grains of the iodide and 30 of the acetate are useful in *rheumatism* in some instances.

In *hepatic torpor* acetate of potash is exceedingly useful, and aids in promoting the flow of bile. It has been used in the *uric acid diathesis*, and is supposed to purify the blood by aiding in the oxidation of effete material. The dose of potassii acetas is from 20 grains to 2 ounces.

ACETATE OF ZINC.

Zinci Acetas, *U. S.* and *B. P.*, occurs in the form of white micaceous crystals, which are efflorescent and quite soluble in water. It acts as a decided astringent to the skin and mucous membranes, but is less astringent than the sulphate of zinc. It is used as a collyria in *eye diseases*, such as *conjunctivitis*, in the strength of 1 to 2 grains to the ounce. In *gonorrhœa* it is often employed instead of the acetate of lead in injections in the strength of 1 to 20 grains to the ounce of rose-water.

The treatment of poisoning by acetate of zinc is that of gastro-enteritis.

ACETIC ACID.

Acidum Aceticum, *U. S.* and *B. P.*, as used in medicine, is a clear liquid made up of 36 per cent. of acetic acid and 64 per cent. of water, and has a sweetish odor. It is obtained from wood by destructive distillation.

Therapeutics.—Acetic acid is seldom used internally, except in combination with potash or soda. As an escharotic the glacial or absolute acetic acid (*Acidum Aceticum Glaciale*, *U. S.* and *B. P.*) is used, and is a powerful caustic. It can be applied to *warts* and other growths, and to old *sores* where the granulations are profuse and slow to heal. The dilute acid (*Acidum Aceticum Dilutum*, *U. S.* and *B. P.*) is used as a lotion in *night-sweats*, and to arrest *epistaxis* and other small hæmorrhages. As a lotion to be widely employed it should be diluted one-half. Vinegar or acetic acid (*Acidum Aceticum*, *U. S.* and *B. P.*) has been used for the decrease of *obesity*, but it is a harmful and often useless remedy, disordering digestion and reducing the patient's strength.

Poisoning.—Where over-doses of acetic acid are taken, the antidote consists in large doses of milk, alkaline liquids, such as lime-water, soap-water, etc., and the general measures adopted for the treatment of gastro-enteritis.

ACONITE, OR MONKSHOOD.

The Aconite of the *U. S. P.* is derived entirely from the tuberous root of *Aconitum Napellus*. At one time the leaves were officinal, but are so no longer, and for this reason the term aconitum radix is not to be employed, as it is a useless distinction.

The plant is indigenous in Germany, France, and Switzerland, and is cultivated as a garden plant all over Europe and America. The root is so strikingly like that of horseradish as to be readily confused with that article of food, but does not emit the pungent fumes of the latter when it is scraped or broken. It is to be remembered, however, that it produces a distinct feeling of heat in the mouth when chewed. The active principle upon which its therapeutical value would appear to depend is aconitin, but there is reasonable doubt whether this can be relied upon as completely as the fluid preparations of the crude drug.

Physiological Action:

NERVOUS SYSTEM.—Aconite in medicinal dose depresses the functional activity of the perceptive centres in the brain, the sensory side of the spinal cord, and, finally, the peripheral ends of the sensory nerves. Applied to a mucous membrane, it acts as a local anæsthetic, but is too irritating for use in the eye. On the motor portion of the body it possesses little effect, unless given in poisonous doses, when it paralyzes the motor tract of the spinal cord and the peripheral motor nerves.

CIRCULATORY SYSTEM.—On the heart aconite acts in moderate amount as a quieter of its movements and force, and so lowers blood-pressure and pulse-rate by a direct action on the heart muscle. There is no evidence of its possessing any direct influence on the vaso-motor system. In poisonous dose it causes first a very marked fall in pulse-rate, preceded sometimes by a rise in rate due to a condition ot weakness and abortive cardiac action, which finally gradually decreases into diastolic arrest of the viscus, which is paralyzed and refuses to respond to stimuli.

RESPIRATION.—In moderate doses it quiets the respiratory movements slightly, particularly if the breathing is hurried before its use. In poisonous doses it paralyzes the respiratory centres, and so causes death.

TEMPERATURE.—It acts as a distinct reducer of fever, probably because of increased heat-radiation due to relaxation of the capillaries and the impaired circulation.

KIDNEYS.—Aconite in fever usually increases the urinary flow.

Poisoning.—When aconite is taken internally in excessive amount it causes tingling of the mucous membranes wherever it touches them, which sensation finally amounts to severe burning. This soon passes away, and is followed by a sense of tingling about the lips and finger-tips, or all over the skin. At the same time the patient feels relaxed, the pulse becomes slow and weaker, but later on rapid and running so that it seems a mere trickle under the finger, sweating more or less severe asserts itself, and fainting may come on. Vomiting may be present, but rarely occurs. The respirations now become slow and shallow, seeming scarcely to expand the lung. The face is pallid and anxious. The eyes may show exophthalmos, or be sunken and dull. The pallor is excessive. Epileptiform convulsions may be present, due to disorder of the circulation at the base of the brain. Previous to this there may be marked anæsthesia of the skin. The pupils may be normal or dilated to a wide degree. The sclerotic coat of the eye is pale and pearly-looking. The temperature is very low. Death may be gradual or sudden, the slightest movement of the body which can throw any strain on the heart stopping that organ in diastole.

TREATMENT OF POISONING.—The patient is to be placed in a prone position or on a board, with the feet higher than the head, to confine the circulation as far as possible to the base of the brain. Hot bottles or bricks are to be placed about the body for the purpose of maintaining the bodily heat. Emetics are not to be given if the symptoms are severe, as vomiting may cause cardiac arrest, owing to the muscular effort involved, or the stomach may be so depressed that the emetics will not act. If vomiting comes on let it be into a towel without the patient being allowed to raise the head. The stomach is to be washed out by means of a stomach-pump or a siphon made of rubber tubing. Ether may be given hypodermically and followed by alcohol, and this again by digitalis. The ether acts at once and lasts while the alcohol is being absorbed, and the alcohol supports the heart until the digitalis, which is the physiological antagonist of aconite, but slow and prolonged in its effects, asserts itself. If the breathing fails artificial respiration is to be employed, or if the heart seems about to cease its action a whiff of the nitrite of amyl may start it going again, but only a few drops should be used, as large amounts depress this organ.

Preparations.—Tincture of aconite (*Tinctura Aconiti*, *U. S.* and *B. P.*) is used in the dose of 1 to 5 drops in water, and repeated as needed. The extract of aconite (*Extractum Aconiti*, *U. S.*) is given in the dose of one-quarter to three-quarters of a grain, while of the abstract (*Abstractum Aconiti*, *U. S.*) 1 grain is used. The fluid extract (*Extractum Aconiti Fluidum*, *U. S.*) is given in the dose of 1 to 2 minims. Fleming's tincture ought never to be used. The active principle aconitin is not officinal. Its dose is $\frac{1}{100}$ of a grain. The *B. P.* preparations that are not officinal in the *U. S. P.* are aconite root (*Aconiti Radix*), aconite leaves (*Aconiti Folia*), aconitin (*Aconitina*), aconite ointment (*Unguentum Aconitiæ*), and aconite liniment (*Linimentum Aconiti*). The dose of the extract of aconite (*Extractum Aconiti, B. P.*), is 1 to 2 grains, and that of *aconitina* $\frac{1}{100}$ of a grain.

Therapeutics.—The employment of aconite is disease is one of the most universally recognized procedures in medicine. It fulfils indications which nothing else can fulfil, and lends itself to the management of a large number of morbid processess, in all of which its effects are explainable by its known physiological action. It is used chiefly for its influence as a cardiac and circulatory quieter, for its effects on the peripheral sensory nervous system, as in the vomiting of pregnancy, and in those states in which, through inflammation elsewhere, the nervous system needs a sedative which will at the same time reduce arterial tension. It may be applied locally over superficial nerves in *neuralgia* in the form of an ointment (2 grains to 1 drachm, or as the oleate of aconitine, 2 grains of the oleate to 100 of sweet oil). It is useful in *croup*, *quinsy*, *sore-throat*, *severe colds*, *bronchitis*, and *asthma* due to exposure, in their early stages. In *pericarditis* it is valuable to allay the inflammation and quiet the excited heart. In adynamic, asthenic affections it ought not to be used. Aconite is useless and harmful in prolonged acute diseases such as scarlet fever, if constantly employed.

In nervous *palpitation* of the *heart* and in the palpitation of *excessive cardiac hypertrophy* it is very valuable. In the *epistaxis* of full-blooded people, and in the early stages of *gonorrhœa* and *chordee* it often affords great relief. Aconite is by far the best circulatory and nervous depressant for children suffering from sthenic fever, particularly of the irritative type.

Administration.—As a general rule, small divided doses of the drug in the form of the tincture (*Tinctura Aconiti*) $\frac{1}{4}$ to $\frac{1}{2}$ drop given every fifteen minutes, will act better than a full dose given at once.

AGARICIN.

Agaric, or touchwood, or punk, has been used in the southern United States very largely in the dose of five grains every few hours in the *night-sweats* of phthisis, and *agaricin*, the alcoholic extract of the drug, has been used with very extraordinary results, under these circumstances, by certain German and English physicians in the dose of from 1 to 2 grains every five hours. Its physiological action is unknown, but it is supposed to act upon the nerve filaments in the sweat-glands. The writer has employed it frequently in varying dose, and has never seen any decrease in the sweats of phthisis produced by it whatever, although he has watched it most closely, expecting to see patients obtain great relief therefrom.

tion by jalap or elaterium (40 grains of jalap powder or $\frac{1}{6}$ grain of elaterium) should be employed, or calomel followed by a saline may be given if slighter effects are needed. In view of the frequency with which alcoholic and opium poisoning are confused, the following table is appended, which is of value in making a differential diagnosis as to the condition of the patient:

Alcoholism and Opium Poisoning.

Alcoholism.	*Opium Poisoning.*
1. Pupils normal or dilated.	1. Pupils contracted.
2. Respiration nearly normal, pulse rapid, and finally feeble.	2. The respiration and pulse are slow and full.
3. Face may be pallid.	3. Face more suffused and cyanosed.
4. Skin cool, perhaps moist, scarcely any difference in consciousness.	4. Skin warmer than in alcoholic poisoning.
	5. Urine is always to be saved for medico-legal examination.

Acute Alcoholism and Apoplexy.

Alcoholism.	*Apoplexy.*
1. Pulse is rapid, compressible, and weak.	1. Pulse apt to be strong, slow.
2. Skin moist, or relaxed and cool.	2. Skin hot or dry.
3. Bodily temperature lower.	3. Bodily temperature raised.
4. Pupils equally contracted or dilated, generally dilated.	4. Pupils unequal.
5. No hemiplegia.	5. Hemiplegia; one side tossed, the other remaining motionless.
6. Breathing not so stertorous, nor so one-sided in lips.	6. Respiration stertorous; the lips being inflated on one side on expiration.
7. No facial palsy.	7. Facial palsy.
8. Unconsciousness may not be complete.	8. Unconsciousness complete.

The smell of alcohol on breath is no guide, as an acute excess of alcohol may have caused the rupture of a bloodvessel.

Chronic Poisoning.—The treatment of this condition may be carried out in two ways: First, by the isolation of the patient and the complete withdrawal of the drug at once, or, second, what is better, a gradual tapering-off in the daily amount of spirit. In either instance isolation must be absolute, and all smuggling of alcohol to or by the patient prevented. The attendants must be absolutely trustworthy, and careful scrutiny of the bed-clothes and closets will often be rewarded by finding hidden bottles. The depression must be treated by the use of nutritious broths highly seasoned, in order to stimulate the stomach, easily digested or predigested foods, and small doses of morphine or coca if the patient is very weak and needs stimulus. Koumyss is an exceedingly valuable preparation under these circumstances. In the treatment of the atonic stomach of drunkards nothing does so well as the following pill:

℞.—Oleoresin. capsici	♏ x.
Olei caryophylli	♏ x.
Hydrarg. chlor. mit.	gr. xx.
Aloes Socotrin.	gr. xl.

M.—Ft. in pil. No. xx. S. One three times a day after or before meals.

(See article on Capsicum.)

Chronic alcoholism may produce cirrhosis of the liver with the resulting symptoms, notably ascites.

Differential Diagnosis of Alcoholism and General Paralysis of the Insane.

Alcoholism.	*Paretic Dementia.*
1. The attacks are shorter, and are more widely separated by intervals of sanity.	1. Attacks are prolonged.
2. The delirium may be of any character.	2. Delirium of grandeur is more marked and defined.
3. The visions are more characteristic, and are evil.	3. The visions are often not evil, but pleasant.
4. The tremors are confined to the head and arms.	4. Tremors are more diffused.
5. Tremors are removed by dose of alcohol.	5. Tremors are made worse by alcohol.
6. Mental symptoms temporarily removed, or, at any rate, improved, by alcohol.	6. Mental state made worse by alcohol.
7. Tremors occur chiefly in the morning.	7. Tremors not confined to the morning.

There is danger of pneumonia from failure of right side of heart in chronic alcoholism, and this state should always be sought for.

Administration.—Brandy and whiskey are generally used as rapidly acting stimulants. They should be given according to the work they are intended to perform. If the action must be instantaneous, as in fainting, they must be employed *hot* and *concentrated* so that the stomach will not have to warm the liquids before absorption, or they are to be used hypodermically if a still more rapid action is required. If they are to aid digestion and support the system, then they should always *be given with the food;* never alone, and never concentrated. They may be given as milk-punch or as egg-nog, the latter being the "heavier" of the two so far as digestion is concerned. Wine-whey is very light and useful.

Mulled wine and champagne are particularly useful in irritable stomach. The latter should always be as devoid of sugar as possible, that is, what is known as "extra dry." Gin is rarely employed as a stimulant, unless in young children or adults when the kidneys are torpid. Stout and porter are of value in wasting diseases, in convalescence from acute diseases, and for nursing women. Lager beer contains too little alcohol to be used as a distinct stimulant, but may be used in moderation to aid digestion, or ale may be employed instead.

Clarets are useful as aids to digestion, and ports are also of value in these cases.

Contra-indications.—All states of cerebral excitement, acute inflammations, the alcoholic habit, apoplexy, meningitis, acute nephritis, aneurism and advanced atheroma contra-indicate the use of alcohol.

The officinal preparations of alcohol are as follows:

Whiskey (*Spiritus Frumenti, U. S.*) should be at least three years old, and be made, in America, from rye for medicinal purposes.

Brandy (*Spiritus Vini Gallici, U. S.* and *B. P.*) is obtained by the distillation of fermented grapes or fruits, and should be from three to five years old before use.

Cologne Water (*Spiritus Odoratus, U. S.*) is used solely as a lotion and perfume

Red Wine (*Vinum Rubrum, U. S.*) is made from grapes not deprived of their skins. White Wine (*Vinum Album, U. S.*) is the fermented juice of the grape without the skins being present during the process.

Dilute (*Alcohol Dilutum, U. S.*), and pure alcohol (*Alcohol, U. S.*), are also officinal.

The unofficinal preparations are:

Rum, which is made from the fermentation of molasses, and contains about 40 to 45 per cent. of alcohol.

Gin is made from rye or barley and has added to it juniper berries and hops. (Good gin and the *Spiritus Juniperi Compositus* of the *U. S. Pharmacopœia* are virtually identical therapeutically). Where diuresis is required and atony of the kidneys is present without inflammation, gin is a useful medicament if stimulants are also needed. It is one of the alcoholic drinks most apt to produce cirrhosis of the liver.

Port Wine (*Vinum Portense, U. S.* and *B. P.*) is a fermented wine to which pure spirit is added to increase its strength. It is one of the strongest table wines, and is useful as a stimulant in convalescence.

Sherry (*Vinum Xericum, B. P.*) has about 30 per cent. of alcohol in it. It is not officinal in the *U. S. P.*

Beer is made by a slow fermentation, while ale is made by a more rapid fermentation at a higher heat.

Porter resembles the other malt liquors closely, except that it contains more solids, due to the scorching of the grain by a high heat.

The *B. P.* preparations that are not officinal in the *U. S. P.* are rectified spirit (*Spiritus Rectificatus*), proof spirit (*Spiritus Tenuior*), sherry (*Vinum Xericum*), amylic alcohol (*Alcohol Amylicum*), and *Mistura Spiritus Vini Gallici.*

ALLIUM.

Garlic is a stimulant to digestion owing to the volatile oil contained in it, which, by its somewhat irritating qualities, excites the gastric mucous membrane to increased secretion. In *persistent colds*, where the bronchial tubes are particularly affected, a garlic poultice made by pounding the bulbs in a mortar is a very efficient, though disagreeable, remedy. In the case of children with colds, garlic may be used boiled in milk and allowed to cool, or the oil of garlic may be given in emulsion in the dose of 1 to 2 drops. If the skin is too delicate in any case to permit of the use of pounded garlic alone, it may be mixed with equal parts of bran, and a regular poultice or plaster made thereby. Employed in this way allium is useful over the spine in spinal convulsions of infants, and, when put over the belly, it acts almost as well as a spice poultice in cases of gastro-intestinal catarrh. The dose of the syrup (*Syrupus Alii, U. S.*) is 1 to 4 drachms.

ALMONDS.

Almonds are officinal in the form of the bitter almonds (*Amygdala Amara, U. S.* and *B. P.*) and the sweet almonds (*Amygdala Dulcis, U. S.* and *B. P.*). The bitter almonds when in the presence of water develop hydrocyanic acid by the combination of the amygdalin and emulsin contained in them, but the sweet almonds do not do so.

Sweet almonds when rubbed up with water form a pleasant-tasting emulsion of an agreeable odor, very useful as a vehicle for other remedies of a disagreeable taste. Almond bread has been proposed as a food for diabetics, owing to its containing virtually no starch, but it is necessary that the oils and saccharine constituents of the almond should first be removed.

When half an ounce of sweet almonds are rubbed up in a mortar with thirty grains of gum arabic and two drachms of sugar, to which are added gradually a half pint of distilled water and the mixture strained, an emollient and soothing drink is made, very useful in *irritations* of the *stomach* and *intestines*, and of the *air-passages* and *pharynx*. The expressed or essential oil of almonds is a useful demulcent, and has been recommended in the *cough of phthisis* given in the dose of a few drops in emulsion.

Bitter almonds give off an oil (*Oleum Amygdalæ Amaræ, U. S.*) which is exceedingly poisonous owing to the prussic acid which it contains, and it is said that one drop will kill a cat, while seventeen drops have killed a man.

Bitter almonds are used to allay irritable coughs and similar states, but are not frequently employed, because other drugs are less dangerous, more stable, and more active as remedial agents. The emulsion of bitter almonds is made as is that of sweet almonds, and may be used in teaspoonful doses for the purposes named when sweet almonds were considered, and as a vehicle in cough mixtures. Both emulsions are useful as vehicles in *gonorrhœa* to diminish the burning on urination, and are supposed to be of value for the removal of freckles and sunburn when locally applied.

The preparations of sweet almonds are—a mixture (*Mistura Amygdalæ, U. S.* and *B. P.*), dose 1 to 2 ounces; a syrup (*Syrupus Amygdalæ, U. S.*), dose 2 drachms to 2 ounces; a compound powder (*Pulvis Amygdalæ Compositus, B. P.*), given in the dose of 1 to 2 drachms; and the oil (*Oleum Amygdalæ Expressum, U. S.* and *B. P.*), the dose of which is 1 to 4 drachms. *Aqua Amygdalæ Amaræ* (*B. P.*) is prepared from the oil of bitter almonds.

ALLSPICE.

Allspice or *Pimenta, U. S.* and *B. P.*, is the nearly ripe fruit of *Eugenia Pimenta*, a tree of the West Indies. It contains an officinal volatile oil (*Oleum Pimentæ, U. S.* and *B. P.*), and is used for flavoring purposes, as a constituent of spice plasters, in diarrhœa mixtures, or as a carminative. It will also prevent the griping of purgative medicines. The dose of the oil is one to five drops. *Aqua Pimentæ, B. P.*, is given in the dose of 1 to 2 ounces.

ALOES.

Aloes or *Aloe* (*U. S.*) of the *U. S. P.* is derived solely from the *Aloe Socotrina*, while that of the *B. P.* is obtained not only from Socotrine aloes, but also from Barbadoes aloes (*Aloe Barbadensis, B. P.*). It is the inspissated or dried juice of the leaves of the plant, but the actual species from which the drug is derived is uncertain, probably from several species. It contains an active principle known as *aloin*, which is a crystalline substance. As aloin is generally sold, it is, however, an amorphous powder of extremely bitter taste.

Physiological Action.—Locally applied to the tongue, aloes is a bitter of rather a persistent taste. According to the studies of Rutherford, the drug increases very considerably the flow of bile in the dog, but in man it cannot in any sense be regarded as a remedy for the production of an increased biliary flow. Rutherford's doses amounted to as much as sixty grains to the dog, which are equal to three or four drachms in man. In the lower animals and man it acts very slowly, requiring many hours for its influence to be distinctly felt, unless the dose be toxic in amount. As much as four drachms of aloes have been injected into the veins of a horse without inducing purgation, probably because four drachms were not enough to affect the bowels. It has been used endermically, and when so employed is said to act thoroughly. It is eliminated by the milk of nursing women, and will cause purgation in an infant put to the breast of such a patient. If the doses be quite large (10 to 20 grains), the passages will be watery; but if the dose be more moderate (2 to 3 grains) the stools will be more thick and pultaceous.

Therapeutics.—Aloes only should be used when a somewhat slow stimulant to peristaltic movement is desired, and never where the object of the physician is to relieve congestions by depletion through the intestine. It is a favorite remedy in cases of *subacute* or *chronic constipation*, but is distinctly harmful if continued constantly for any length of time, as it seems to produce atony of the bowel. Owing to its bitter properties it acts as a tonic to the stomach, and is often given with iron to favor the absorption of this metal by stimulating the liver and by preventing any constipation produced by the chalybeate.

When taken in a large enough dose to produce a copious passage, it nearly always produces a feeling of weight and fulness in the region of the rectum after the evacuation, and the writer has seen severe rectal catarrh set up in this way. If given alone it is very apt to produce griping, and it ought always to be combined with some other drugs whose tendency it is to prevent intestinal spasm.

In cases of *hæmorrhoids* occurring in persons suffering from general muscular relaxation and atony it is said to do great good, but its use under these circumstances is by no means universal or generally accepted as correct. In weak, anæmic persons, leading sedative lives, it may be used combined with tonics to relieve the *constipation* so often a pressing symptom in these cases. In *amenorrhœa* dependent upon atony of the sexual system, or anæmia, or constipation, it is thought to have a specific emmenagogue influence. Locally applied in the form of the glycerole of aloes, it has been employed in the healing of *old* and *new fissures* of *mucous membranes*, and even in *bedsores*. The glycerole of aloes is to be made by evaporating four to eight quarts of tincture of aloes and gradually adding thirty parts of glycerine.

Contra-indications.—Constipation occurring in plethoric persons should not be treated by aloes, and it should not be used if any irritation or catarrh of the intestine is present.

Administration.—Aloes is generally given in a pill, combined with spices and belladonna (see Constipation). The dose should be about 1 to 5 grains as a laxative, and 10 grains as a purge. The *Aloe Purificata, U. S.*, should always be used. The officinal preparations most commonly employed are the pill of aloes (*Pilulæ Aloes, U. S.* and *B. P.*), two grains aloes and soap each; the pill of aloes and myrrh (*Pilulæ Aloes et Myrrhæ, U. S.* and *B. P.*), two grains of each constituent; the pill of aloes and mastisch (*Pilulæ Aloes et Mastiches, U. S.*, two grains of aloes), or the "Lady Webster dinner pill;" the pill of aloes and iron (*Pilulæ Aloes et Ferri, U. S.* and *B. P.*), one grain of aloes and one of dried sulphate of iron, and the pill of aloes and asafœtida (*Pilulæ Aloes et Asafœtidæ, U. S.* and *B. P.*), four grains of aloes, asafœtida, and soap. The liquid preparations are the tincture (*Tinctura Aloes, U. S.* and *B. P.*), dose 1 to 3 fluidrachms; the tincture of aloes and myrrh (*Tinctura Aloes et Myrrhæ, U. S.*), dose 1 to 2 fluidrachms;[1] and the wine of aloes (*Vinum Aloes, U. S.* and *B. P.*), containing cardamoms and ginger, the dose of which is ½ to 1 drachm, or even 2 drachms. The *B. P.* preparations, besides those given, are *Aloin*, dose ½ to 2 grains; *Enema Aloes*, given in the dose of 10 ounces; the *Decoctum Aloes Compositum*, dose, ½ to 2 ounces; and the extract, *Extractum Aloes Socotrinæ* and the *Extractum Aloes Barbadensis*, the dose of each of which is 2 to 6 grains.

ALUM.

Alum (*Alumen, U. S.* and *B. P.*) is the sulphate of aluminium and potassium, or of aluminium and ammonium, crystallized from a watery solution. At present all the alum of commerce is made in the manufacture of coal gas for illuminating purposes, and it is therefore very cheap. It occurs in the form of octahedral crystals, and has an astringent taste and acid reaction. After the crystals are exposed to the air for some time they become covered with a white coating.

Physiological Action.—When alum is brought in contact with a mucous membrane it produces whitening, constriction, and puckering of the part, and applied to the skin thickens and toughens it by means of its astringent action. In either case it decreases secretion and causes contraction of the local bloodvessels and capillaries. Large amounts given for any time seem to increase secretion. Very large amounts are necessary to produce death. As much as two ounces will not kill a sickly dog. This is largely due to the fact that the vomiting and purging rids the animal of the drug, for if vomiting is prevented death rapidly ensues from gastro-enteritis. Injected into the blood it produces embolism and thrombosis.

Therapeutics.—Alum is used at present in a number of diseases, chiefly as a local application. In case of ordinary *sore-throat* applications of a strong solution (20 grains to the ounce of water) on a swab will be found very useful. It is a valuable gargle in this condition, but ought not to be used because of its destructive action on the teeth. In *hæmorrhage*, where the leaking bloodvessels can be directly reached, alum is a remarkable hæmostatic, aiding in the arrest of the bleeding in three ways, namely, by coagulating the albumin, by constringing the parts, and by crystallizing when applied in large amounts on lint, and thereby affording a surface which is rough and aids coagulation. In hæmorrhage after tooth-extraction this is a very useful treatment. Dissolved in water, or alcohol, it makes an exceedingly efficient application for sponging in *night-sweats* or *localized sweating* of the feet or hands. In *conjunctivitis* as a lotion alum may be employed in a solution of 1 to 3 grains to the ounce of water for a child, or in the form of alum curd, made by adding powdered alum to milk or white of egg until a curd is formed, which is then applied to the eye every few hours or oftener. This is often useful in *ecchymosis of the eyelid*, or "black eye," to prevent much exudation and discoloration. In cases where *granular conjunctivitis* occurs the use of the alum crystal or stick is sometimes very useful, the lid being lifted and the alum passed lightly over it. In *hæmoptysis* a fine spray of a strong solution of alum, 20 grains to the ounce, may be employed, the necessity of the spray being very fine being constantly borne in mind. This method may also be resorted to in *bronchorrhœa* or *chronic bronchitis* with excessive secretion, and in *chronic catarrh of the pharynx* and *larynx*. In *mercurial ptyalism* the drug may be used on a swab. Bathing the parts affected with an alum solution is said to be an efficient remedy in *chilblains* and even in *pruritus vulvæ*. As a vaginal wash for excessive *leucorrhœa* in the strength of from 10 to 20 grains to the ounce of water it is of value. Some observers claim good results from its use in *diphtheria* and *tonsillitis*. In *follicular tonsillitis* the alum stick may be deeply applied to the swollen or depressed follicles. Burnt Alum (*Alum Exsiccatum, U.S.* and *B. P.*) is useful as a dressing for *old ulcers* and *sores*, and has been highly recommended as an application for *swollen gums* where they press and over-ride a tooth, particularly at the back of the jaw. In *ingrowing toe-nail* with granulations, a piece of twisted absorbent cotton soaked in strong alum solution and inserted under the edge of the nail, will do a great deal toward a cure in most instances.

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[1] Sometimes called Elixir Proprietatis.

Internally alum has been used in *diabetes*, *gastralgia* and *dysentery* of an acute and chronic type. In lead colic it seems to be of value in conjunction with morphine to allay the pain. In some forms of *constipation* it is said to be quite valuable if given in large dose. At one time it was largely employed in *membranous croup* in emetic dose for the dislodging of the membrane and the astringent effect as it was swallowed and expelled.

Alum may be used as an antidote in *acute lead-poisoning*, as it is a soluble sulphate and also an emetic.

The emetic dose of powdered alum is a heaping teaspoonful to a child or a tablespoonful to an adult.

Glycerinum Aluminis (1 to 5) is officinal in the *B. P.*, and is used as a local astringent application.

AMBER.

Succinum is derived from a fossil resin found in Prussia and Bohemia and is officinal in the form of the oil (*Oleum Succini, U. S.*), which is volatile, quite irritant, and obtained by destructive distillation from the deposits named.

Therapeutics.—Oil of Amber is one of the best remedies for *persistent hiccough* that we have. It is very useful as a counter-irritant over *rheumatic joints,* and has been used in *asthma, whooping-cough,* and *hysteria* with good results. In the *bronchitis of infants,* with nervous disturbance, oil of amber in the proportion of one to three parts of olive oil applied to the back and front of the chest is of service. The dose internally is 2 to 6 minims in emulsion.

AMMONIA.

Ammonia is a gas of a very acrid, burning taste and sensation, capable of producing death very rapidly, when inhaled, by the inflammation and spasm of the glottis which ensues. It is made in large amounts in the manufacture of coal gas.

Physiological Action.—When ammonia comes in contact with the tissues of the body it acts as a most powerful irritant, causing a reddening of the parts, followed, if the exposure be long enough, by death and sloughing. If it be inhaled as a gas it may produce instant death by spasm or œdema of the glottis, or if a strong solution of it is swallowed the same accident will occur. After more moderate inhalations severe bronchitis or pulmonary œdema may occur.

NERVOUS SYSTEM.—If ammonia be injected into the blood of animals violent convulsions at once ensue which are largely tetanic in type and depend upon a spinal action of the drug, since they are not stopped by division of the spinal cord, as they would be if the convulsive movements had their origin in the brain. The drug in moderate amounts acts as a spinal excitant, increasing reflex action and all the evidences of spinal activity. If applied directly to a nerve, either motor or sensory, it paralyzes it, or if it be in very weak solution it seems to increase its functional activity.

CIRCULATION.—Upon the circulation ammonia acts as a very powerful but fleeting stimulant, increasing to a very great extent the pulse-rate, pulse force, and arterial pressure. The cause of the increased pulse-rate depends upon stimulation of the accelerator nerves of the heart, and of the heart itself, while the increased force is due to the same cause, for Ringer and Sainsbury found the strength of the ventricles much increased. The rise of arterial pressure is due to the increased amount of blood pumped into the arteries by the stimulated heart and probably by an action on the vaso-motor centre, although it is stated that this is not so. As the drug acts as a stimulant on the respiratory centre, which is very near the vaso-motor centre, it probably increases the functional activity of both. If by means of intravenous injection the ammonia reaches the heart in large amount, this organ ceases its beat at once from paralysis of its muscular walls.

THE BLOOD.—In moderate amounts the drug has no effect on the blood, but when injected in poisonous quantities it causes the blood to fail to take up oxygen, according to Feltz and Ritter.

RESPIRATION.—The injection of ammonia in moderate quantities into the blood causes an acceleration of the rate of respirations due to a stimulation of the respiratory centre, so that the respiratory movements not only become more full but more rapid. If the drug is inhaled in small amounts the same action is seen in a less degree and the changes both in breathing and circulation are partly due under such circumstances to a reflex irritation transmitted along the sensory nerves.

ELIMINATION.—Ammonia, when taken into the body, is so extremely fleeting in its action, that the question as to its escape is one of interest. If large amounts are taken it is partly given off by the breath, but more of it is burnt up in the system, and, according to Bence Jones, eliminated as nitric acid by reason of its being oxidized in the body. Some persons think that it is partly excreted as urea.

Therapeutics.—Ammonia is employed for three distinct purposes in medicine, provided that its salts are not considered; namely, as a circulatory and respiratory stimulant, as a counter-irritant, and as an antacid.

The indications for its use in the first class of cases are all forms of *sudden cardiac failure*, where there is no time nor opportunity to use the more stable and slowly acting drugs. These instances occur in *snake-poisoning*, in *syncope* from fright or other shock, or indigestion, in *sudden cardiac failure* in *fevers* and *pneumonia*, and in all cases where rapid cardiac stimulation is needed. Ringer has found that the drug has the extraordinary power of causing a heart stopped or depressed by chloroform to return to its beating. In these pressing cases it should be injected directly into the vein of the leg so as to act more quickly. If put into the subcutaneous tissues it is almost certain to make a slough, and if injected into a vein of the arm it may reach the heart in too concentrated form and cause cardiac depression.

In *gastric acidity* due to fermentation, with the development of abnormal acids, it is the most active remedy we can employ, but is not to be given if acute irritation of the stomach exists.

In prolonged diseases its employment is not particularly advisable, owing to its fugacious action, although it is largely used, and the constant administration necessarily required is apt to produce gastric disorder. *After surgical operations* in children it seems to be of value in the form of carbonate, two grains in mucilage of acacia and water every two hours. Some persons claim that ammonia is useful as a sedative in *drunkenness*, but this is doubtful.

Locally applied, strong ammonia water may be used to produce a blister by placing a few drops on the skin under an inverted watch-glass. Ammonia water may also be applied to the *spots stung by insects* often with great relief. The waters of ammonia are used externally in stimulating liniments and hypodermically when the drug is so given. The stronger water ought not to be employed for the latter purpose. The aromatic spirit is generally used internally in the dose of ½ drachm to 1 drachm, well diluted. This is also the dose of the ordinary spirit. The carbonate of ammonium is given in the dose of from 5 to 15 grains, and the muriate in the same quantity.

Administration.—Ammonia is never employed in medicine as pure ammonia, but in the form of the stronger water (*Aqua Ammoniæ Fortior, U. S.; Liquor Ammoniæ Fortior, B. P.*) and the weaker water (*Aqua Ammoniæ, U. S.*; *Liquor Ammoniæ, B. P.*); the spirit of Mindererus (*Liquor Ammoniæ Acetatis, U. S.* and *B. P.*), dose 1 to 2 fluidrachms; the spirits of ammonia (*Spiritus Ammoniæ, U. S.*), dose 30 to 60 minims in water; the aromatic spirit of ammonia (*Spiritus Ammoniæ Aromaticus, U. S.* and *B. P.*), dose 25 to 60 minims in water; sulphate (*Ammonii Sulphas, U. S.*), phosphate (*Ammonii Phosphas, U. S.* and *B. P.*), and valerianate of ammonium (*Ammonii Valerianas, U. S.*). The *B. P.* preparations besides those given are: *Sulphide of Ammonium, Oxalate of Ammonium, Liquor Ammonii Citratis* dose 2 to 6 fluidrachms, *Liquor Ammonii Citratis Fortior* dose 30 minims to 2 fluidrachms, *Liquor Ammonii Acetatis Fortior* dose 25 to 75 minims, *Spiritus Ammoniæ Fœtidus*, and *Linimentum Ammoniæ, U. S.* and *B. P.*

Benzoate of Ammonium.

Benzoate of Ammonium (*Ammonii Benzoas, U. S.* and *B. P.*) is employed chiefly for its diuretic influences, which depend entirely upon the benzoic acid present in the compound. As benzoic acid is eliminated as hippuric acid, and ammonia as nitric acid, this drug may be employed in cases where the physician desires to make the urine decidedly acid; as, for example, in patients suffering from catarrh of the bladder when the urine is loaded with phosphates, which may be dissolved by this acidulation. The dose is 10 to 30 grains.

Bromide of Ammonium.

Bromide of Ammonium (*Ammonii Bromidum, U. S.* and *B. P.*) is really a crystalline salt but is generally found in commerce as a white, granular powder which, when exposed to the atmosphere, becomes slightly yellowish. It is readily dissolved in water.

Physiological Action.—Applied to the mucous membrane the bromide of ammonium produces a salty taste and is markedly pungent, dissolving readily in the liquids of the mouth. If large amounts are swallowed it causes burning pain in the belly and evidences of gastro-enteritis.

NERVOUS SYSTEM.—The action of this drug upon this part of the body is its most important effect. Given to the lower animals it produces in frogs total loss of reflex activity, preceded, it is said, in some cases by tetanic convulsions, although no such motor disturbance may take place. According to a series of studies undertaken by me to determine the exact effect of the drug, it was found that the spinal cord was depressed, both on its motor and sensory side, while the nerves and muscles escaped. These results are in accord with those of other investigators who also found that the nerves are unaffected. On the cerebral cortex it acts as a very distinct sedative.

CIRCULATION.—Upon the circulation bromide of ammonium acts as a stimulant in small doses, but as a cardiac paralyzant if a large amount comes in contact with the heart. In medicinal dose it is distinctly stimulant to the circulation.

Therapeutics.—The bromide of ammonium may be used in nearly every instance where bromide of potassium may be employed, and possesses the distinct advantage of being less depressant to the general system. It is, however, no less apt to disorder the stomach even if given in moderate dose. In *epilepsy* it would seem to be of as much value as the potash salt and may be combined with it in some cases with success. (See article on Epilepsy.) According to Da Costa, the drug is of very distinct value in *rheumatism* in the dose of 60 to 80 grains a day well diluted, although its manner of action in this disease is not known. As just stated, ammonium bromide is of value in exactly the same cases as bromide of potassium, and a free discussion of its uses will be found under that drug. The dose is 10 to 30 grains. It is incompatible with spirit of nitrous ether.

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Carbonate of Ammonium.

Carbonate of Ammonium (*Ammonii Carbonas*, *U. S.* and *B. P.*) undoubtedly has an action exactly like that of the liquid preparations and is used either alone or with the chloride in the treatment of *bronchitis*, particularly in babies and young children. The dose is 2 to 10 grains in syrup of acacia. It is a rapidly acting cardiac and respiratory stimulant.

Chloride of Ammonium.

The Chloride or Muriate of Ammonium (*Ammonii Chloridum*, *U. S.* and *B. P.*) has an entirely different action and therapeutic use from the rest of this group. It possesses almost no influence over the heart and respiration but does exercise a very stimulant effect on mucous membranes, increasing the discharge of mucus and producing a free secretion. The consideration of its use in diseases of the lungs can be found in the articles on Pneumonia and Bronchitis It has been employed in *intermittent fever*, but has gone out of use, and also in *neuralgias of the ovarian type*, by Goodell and others. In *chronic torpor of the liver* and *hepatitis*, and even in *cirrhosis* and *hepatic abscess*, it has been thought of value. Many clinicians have found it useful in *gastric* and *intestinal catarrhs* of children of a very subacute type and it is the routine treatment for all such cases which come under treatment at the Children's Department of the University of Pennsylvania and elsewhere where the author has charge. The dose is 2 to 15 grains, preferably given with liquorice and water to mask the taste.

Iodide of Ammonium.

Iodide of Ammonium (*Ammonii Iodidum*, *U. S.*) may be employed in the dose of 2 to 3 grains in all cases where the iodide of potash is indicated, and seems to possess equal alterative influences. It has been recommended as a local application in cases of *enlarged tonsils* in the form of a solution of 30 grains of the salt to the ounce of glycerin, particularly if struma is the cause of the enlargement. The application is to be made once a day with swab or camel's-hair brush. It is necessary that this solution be not exposed to the air or it will decompose.

Valerianate of Ammonium.

Valerianate of Ammonium (*Ammonii Valerianas, U. S.*) is the salt of ammonium commonly used in the *nervous unrest* of pregnant or hysterical women, or at the *menopause* in the peculiar nervous disorders of that period. In poisonous doses it paralyzes the spinal cord in the lower animals. It is usually given in the form of the elixir of the valerianate of ammonium, the dose of which is a teaspoonful to a dessertspoonful, or it is combined with the bromides, under which circumstances it is much more efficacious. The dose of the salt itself is 10 to 15 grains.

AMMONIAC.

Ammoniac (*Ammoniacum, U. S.* and *B. P.*) is a resinous gum obtained from *Dorema Ammoniacum* and is used very little in medicine at the present time. Internally and externally it produces some irritation when brought in contact with the tissues and may be used internally in the dose of 10 to 30 grains in pills in cases of *old bronchitis* devoid of any true inflammatory process. It is officinal in the form of the plaster of ammoniac (*Emplastrum Ammoniaci, U. S.* and *B. P.*), which is used as a stimulant plaster over enlarged glands and joints, and as the plaster of ammoniac and mercury (*Emplastrum Ammoniaci cum Hydrargyro, U. S.* and *B. P.*), which is used for the same purpose, and finally there is the mixture of ammoniac (*Mistura Ammoniaci, U. S.* and *B. P.*) used in chronic bronchitis, in the dose of a tablespoonful.

AMYL NITRITE.

Amyl Nitrite (*Amyl Nitris, U. S.* and *B. P.*) is a very volatile, somewhat oily, liquid possessing a peculiar penetrating pear-like odor. It is made by the action of nitric and nitrous acids upon amylic alcohol, and it is not to be confounded with *nitrate* of amyl, which has a different physiological action and is never used medicinally.

Physiological Action.—When swallowed or inhaled the drug produces staggering, fulness in the head, roaring in the ears, duskiness of the face, and finally utter muscular relaxation, so that the animal or man falls to the ground. The heart beats very rapidly and forcibly and the respirations become gasping.

NERVOUS SYSTEM.—Nitrite of amyl acts as the most rapid of all the nervous depressants and sedatives known except prussic acid.

Experiments show that its dominant action is on the motor cortex of the brain and the motor nerves, as well as the motor side of the spinal cord. Upon the nervous apparatus of sensation nitrite of amyl has no effect in medicinal amounts and can never be used to relieve pain unless it be due to spasm or to angina pectoris. The muscles are, however, depressed by large amounts.

CIRCULATION.—When nitrite of amyl is used the pulse becomes exceedingly rapid, while the arterial tension progressively falls. The increase in pulse-rate is due to depression of the inhibitory apparatus of the heart and to the sudden relaxation of the bloodvessels, by reason of which, the resistance being taken away, the heart beats faster. The fall of arterial pressure is due to a depression of the vaso-motor centres and the muscular coats of the bloodvessels. In very small amounts the drug stimulates the heart muscle (Reichert), but its dominant action is that of a depressant.

THE BLOOD.—In medicinal dose this drug causes a chocolate color of the arterial blood due to the change of oxyhæmoglobin into methæmoglobin.

URINE AND ELIMINATION.—The urine nearly always contains sugar after the use of the nitrite of amyl and there is increased diuresis. The drug is eliminated very rapidly from the body by the lungs and kidneys. In the urine it is formed into a nitrate if nitrite of potassium be employed.

TEMPERATURE.—If the nitrite of amyl be inhaled for any time the most remarkable fall in temperature ensues, probably due to diminished oxidation but possibly to some effect on the heat centres. The vascular dilatation also tends greatly to aid in the fall of bodily heat.

Therapeutics.—Nitrite of amyl is used to *relax general* or *local muscular spasms*, for the relaxation of the spasm of *epilepsy* and for *aborting an on-coming fit*, for the prevention and subjugation of *strychnine convulsions* and *tetanus*, and for the relief of *angina pectoris*. It may be used in *puerperal eclampsia*, but it is a dangerous remedy because of its relaxation of the uterus and the consequent danger of post-partum hemorrhage. In *dysmenorrhœa* with uterine spasm it often gives great relief. In *cardiac failure* from fright or anæsthetics it is often of great value in single whiffs. If it does not act at once under these circumstances it is worse than useless to push it. It has also been found of value in *whooping-cough*, *laryngismus stridulus*, *asthma*, *spasmodic croup* and *infantile convulsions*. In *migraine* with local vaso-motor spasm and true hemianopsia it is very useful. In *strychnine poisoning* and *tetanus* it must be used between the spasms or else given hypodermically, as the respiratory cramp prevents its inhalation.

Administration—The drug is usually given by placing three to five drops on a handkerchief and inhaling the fumes, or it may be dropped on sugar and taken by the mouth in the same quantity.

It is important to remember the fact that the effects of the drug are more severe for a moment after its use than during its inhalation.

The best way for patients to use the drug is to have it in pearls of glass, each holding 3 minims. One or more of these may be crushed in the handkerchief and inhaled.

ANTHRAROBIN.

Anthrarobin, which was originally discovered by Liebermann, seems to possess equal value with its relative chrysarobin, and to be capable of substitution for this substance in the treatment of skin diseases. It is a yellowish powder, tolerably stable in a dry atmosphere, and is not soluble in acids or water, but readily soluble in dilute alkaline solution or alcohol, at first making a solution of a brown color, which as oxygen is taken up passes to a green, and, finally, to a violet.

Therapeutically, anthrarobin has been employed by Rosenthal and by Behrend, and more recently Kobner has recorded his experience with it, employing it with good results in a 10 to 20 per cent. solution in the various forms of tonsurans as a wash. Rosenthal has used it in *psoriasis* and *pityriasis versicolor* and *herpes*, and Behrend asserts that it is often better in its effects upon the skin than chrysarobin, as it produces less inflammation and only discolors the skin slightly. It also possesses the additional value of making so slight a stain on the linen that it can be removed by washing.

According to most authorities, it is best to keep it in alcoholic solution, and, if the bottle is well corked, such a mixture remains good for a week.

ANTIMONY.

Antimony itself, or its oxide, is never used in medicine, owing to its insolubility, but is generally employed as the tartrate of antimony and potassium or Tartar Emetic (*Antimonii et Potassii Tartras, U. S.*), or in the form of the sulphide (*Antimonii Sulphidum, U. S.*); purified sulphide (*Antimonii Sulphidum Purificatum, U. S.; Antimonium Nigrum Purificatum, B. P.*); and sulphurated antimony (*Antimonium Sulphuratum, U. S.* and *B. P.*). The latter are so rarely employed and are such unreliable and useless preparations that they will probably be dropped in the present revision of the *Pharmacopœia.*

Tartar Emetic.

Tartar Emetic (*Antimonii et Potassii Tartras, U. S.; Antimonium Tartaratum, B. P.*) is made by boiling the oxide of antimony with bitartrate of potassium and water. Although it is really crystalline it is generally sold as a fine powder, owing to these crystals being easily pulverized. It is insoluble in absolute alcohol but soluble in ordinary water and still more so in boiling water. In dilute alcohol it is partly soluble.

Owing to its chemical constitution tartar emetic should never be given with either acids or alkalies, and all drugs containing tannic acid are also incompatible with it, owing to the fact that an insoluble tannate is rapidly formed which is absorbed very slowly if at all. So complete is the insolubility of the compound so formed that tannic acid is the best antidote to the drug that we possess.

Physiological Action.—Tartar emetic, when applied to mucous membranes, produces a burning sensation, while upon the skin it may readily cause a large amount of irritation if the part be delicate. If kept in contact with a mucous membrane very distinct inflammatory changes occur, and if it be applied to the skin constantly, redness, followed by acne of a pustular character, appears, which finally ends in ulceration and sloughing if the use of the drug is persisted in. Under these circumstances the vitality of the parts seems interfered with, and, as a result, healing takes place very slowly indeed.

NERVOUS SYSTEM.—Antimony is a depressant to the sensory side of the spinal cord and a paralyzant to all the spinal centres, motor and sensory, in poisonous dose.

It is stated that sensation to heat and acids are lost before the ordinary sense of touch is destroyed. The convulsions which sometimes ensue after poisonous doses in the lower animals are due to anæmia of the brain brought on by the circulatory depression. Ringer and Murrell have proved antimony to be a motor-nerve and muscle poison.

CIRCULATION.—The chief influence of antimony is exerted upon the circulation. In small doses it lowers the pulse-rate by a direct depression of the heart muscle and simultaneously decreases arterial tension by an action upon the peripheral portions of the vaso-motor system in the walls of the bloodvessels, but the vaso-motor influences may be centric, and this point can only be considered as *sub judice*.

Along with the lowering of the pulse-rate there is nearly always a corresponding decrease in cardiac power. When poisonous doses are employed death ensues after great circulatory and respiratory depression, as will be seen below. The heart is found relaxed and flabby and utterly dead to all stimuli, although if the dose has not been very excessive and digitalis be freely employed the heart may be made to beat again, at least in the frog. The drug in these doses is thought to depress the peripheral ends of the vagus nerves.

RESPIRATION.—The drug has little or no effect upon respiration except when given in doses not medicinal. Under these circumstances death is produced in three ways, all of them acting together. Primarily, the respiratory centre in the medulla is depressed, and the governing nerves of breathing, the pneumogastrics, are also inactive; secondarily, the cardiac failure readily causes pulmonary congestion; and, thirdly, the drug causes such an outpouring of liquid and mucus into the bronchial tubes that the patient is drowned in his own sputum, which he is too weak to expel.

STOMACH AND INTESTINES.—Antimony in toxic doses is a powerful irritant to these portions of the body. In full medicinal amounts it acts as a slow but powerful emetic, producing much nausea. The vomiting is due to an action on the vomiting centre in the medulla and to a direct action on the stomach itself. The drug is, therefore, a centric and peripheral emetic.

Very full doses produce watery purging attended with some griping and tenesmus.

ELIMINATION.—Antimony escapes from the body in all the secretions, but largely by the bowels. The latter method seems chiefly to follow poisonous doses, and Wood believes with others that purging is an effort at elimination.

Poisoning.—When toxic doses of tartar emetic are taken the pulse at first becomes slightly weaker and slower, the skin becomes moist and relaxed, a general sense of relaxation comes on and simultaneously a sensation of severe nausea and gastric distress appears.

Following this condition violent vomiting asserts itself. The ejected mass consists of the contents of the stomach, mucous, bile, and watery fluids, and perhaps blood. Purging appears almost as early as the vomiting and consists first of the contents of the intestines, then mucus, then bile, and, very rarely, blood. These signs very rapidly disappear and the characteristic peculiar "rice-water" stools[1] come on. The general condition of the patient is now most serious, the face is pinched, livid and covered with cold sweat. The pulse is rapid and shuttle-like—to and fro—or lost at the wrist; the arterial tension is almost *nil*. The respirations are faint and fluttering and so shallow as hardly to be seen. Cramps in the calves of the legs attack the patient, due to the abstraction of water from the tissues by the violent purging, and the temperature falls lower and lower as death approaches. The general condition is such that all the signs point to Asiatic cholera, and it cannot be separated from this disease without a history of the case or a chemical analysis of the secretions, which ought always to be preserved.[2]

The treatment of antimonial poisoning consists in the internal administration of large amounts of tannic acid, in the use of the stomach-pump, and in the maintenance of an absolutely prone position. The patient should vomit into towels and not raise the head from the ground; the head, indeed, should generally be placed below the heels. External heat, alcohol, and digitalis should be thoroughly used, and opium should be employed hypodermically to allay pain and irritation unless respiration is too feeble.

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[1] A "rice-water" stool is one which, on standing in a glass, separates into two layers, the lower white and flocculent, the upper almost clear and watery.

[2] This is probably as good a place as will occur to state that the receptacles which receive the secretions and excretions of a person dying of any poison should be placed in a chemically-clean jar capable of being sealed tight. The same rule applies to the jars holding organs at the post-mortem. The jars should be ready and no intermediate vessel used. They should be sealed at once and kept so until claimed by the authorities.

Fatty degeneration of the tissues may occur after the poisoning.

Therapeutics.—Tartar emetic is employed for at least five separate purposes, the most usual of which is as a *circulatory quieter* and *sedative*. The indications for antimony as a circulatory depressant are not so generally recognized at present as they were at one time, on account of the introduction of other drugs. Suffice it to state that all states of *sthenic inflammation* with a bounding pulse, high fever, and symptoms of robust constitution permit of its use, while all asthenic conditions most emphatically contra-indicate its employment. In *colds*, to break *forming diseases*, and to allay *inflammation*, it is given in moderate dose. It is useful in *sthenic bronchitis* as an expectorant. Under these circumstances it may be given in emetic dose; or, if emesis is not desirable, minute amounts given hourly are of value, such as $\frac{1}{60}$ of a grain every hour, or a teaspoonful of a solution of 1 grain to a half-pint every hour may be used. This is a particularly useful method in children, as it is tasteless and does not produce nausea and vomiting.

In *acute catarrh of children* affecting the stomach and entire alimentary canal and associated with little fever, the use of the drug as just described is extremely valuable, and often aborts an attack in the same dose.

As an emetic it is slow but forcible and ought not to be used in poisoning owing to its slowness. Before the introduction of anæsthetics emetic doses were employed to relax the muscles in reducing *dislocations* and *fractures*.

Tartar emetic is harmful if irritation of the stomach is present or if kidney lesions are active, and if one good-sized emetic dose is not sufficient to produce vomiting it should not be repeated. This dose should be large enough to be effective or none at all be given. If this rule is disobeyed systemic changes come on with undesired force in those cases where emesis fails to occur.

As a *counter-irritant* antimony is employed in the form of an ointment whenever a very slowly acting and prolonged counter-irritation is to be attained, as in *epilepsy* or similar chronic states, and in old *enlargements of the joints*.

Antimony as a diaphoretic is useful, but unnecessary owing to its disagreeable effects, such as nausea and intestinal disturbance.

Administration.—The dose of tartar emetic, when there is an excited circulation, is $\frac{1}{10}$ to $\frac{1}{20}$ of a grain every three hours till an effect is obtained. As an emetic the dose is $\frac{1}{2}$ to 1 grain. The wine of antimony (*Vinum Antimonii, U. S.; Vinum Antimoniale, B. P.*) only contains two grains of tartar emetic to each ounce and may be used in the dose of ½ to 1 teaspoonful or, as an emetic, in the dose of 1 to 2 tablespoonfuls. The compound pill of antimony (*Pilulæ Antimonii Compositæ, U. S.*) contains sulphurated antimony, calomel, guaiac, and tragacanth; the dose is 1 to 3 pills.

The ointment of antimony (*Unguentum Antimonii Tartarati, B. P.*) is used externally as a counter-irritant spread on a rag or piece of lint. Antimonial powder (*Pulvis Antimonialis, U. S.* and *B. P.*) or James's powder contains oxide of antimony and phosphate of calcium and is given occasionally as an antipyretic in rheumatism and fever in the dose of 3 to 10 grains.

The compound syrup of squill (*Syrupus Scillæ Compositus, U. S.*), otherwise known as "Coxe's Hive Syrup," contains three-fourths of a grain of tartar emetic to the ounce. The dose is 20 to 30 drops for an adult as a sedative, or from this amount to a drachm to a child as an emetic. *Liquor Antimonii Chloridi, B. P.*, is not officinal in this country, and in England is rarely used as an escharotic.

ANTIPYRINE.

Antipyrine is a derivative of coal tar, its chemical name being dimethyloxyquinizine. In appearance it is a white powder of a somewhat bitter taste and is very soluble in water, less so in ether, alcohol and chloroform. The process by which it is made is patented, and unlike that of its rival, acetanilide, is unknown except to the manufacturers.

When antipyrine is given to man in full medicinal amount it causes a buzzing and tightness of the head not unlike that produced by quinine. The bodily temperature, if normal, is depressed a fraction of a degree, but no other symptoms are manifested. If the dose be quite large some blueness of the lips and finger-nails appears, chilly sensations are experienced, and finally a profuse sweat breaks out over the entire body, which is more severe if fever has previously existed. Larger doses sometimes cause nausea and vomiting.

Physiological Action:

NERVOUS SYSTEM.—When a poisonous dose is given to one of the lower animals, relaxation, utter loss of reflex action, and total inability to move come on at once and death ensues. Somewhat smaller doses produce exceedingly severe tetanic and epileptiform convulsions, but consciousness seems to be preserved. It has been proved that the chief cause of the convulsion is an action of the drug on the brain.[1] Very large toxic doses, therefore, decrease reflex action and smaller ones increase it, though medicinal amounts certainly lessen reflex activity to a notable degree. The cause of this failure of reflexes is depression of the sensory nerves and the receptive centres of the spinal cord. Medicinal amounts must, therefore, be regarded as very distinct nervous sedatives, acting much more actively on the nerves of sensation than on those of motion.

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[1] See my Essay on Antipyretics, Philadelphia, 1890.

CIRCULATION.—The studies of a very large number of pharmacologists and clinicians prove most conclusively that antipyrine has no effect on the circulation in moderate doses, unless these be so frequently repeated that cumulative effects ensue. Large, poisonous doses lower blood-pressure, unless convulsions are present, when the pressure is raised. The action of the drug on the circulation is a very unimportant part of its power, and is not generally to be considered in disease. In the cases where vascular depression and collapse have followed its use it has been employed in excessive amounts, or the fall in bodily temperature has caused the untoward influences. (See Fever and its Treatment.)

BLOOD.—No spectroscopic changes in the blood follow the use of medicinal doses of antipyrine in the ordinary individual, but in poisonous amounts it produces methæmoglobin. If the doses be toxic, or idiosyncrasy exists, cyanosis may come on. That the blood is not influenced by small amounts is proved by the absence of hæmatin in the urine of persons taking the drug. The corpuscles suffer no changes except in very pronounced poisoning, when they are said to become crenated and shrivelled.

RESPIRATION.—When antipyrine is given in lethal doses death results from failure of the respiratory centre. Ordinary doses have no effect on this function, but large ones make the breathing more rapid.

TEMPERATURE.—In normal men and animals antipyrine may be considered as without effect so far as normal bodily temperature is concerned. In fevered animals it has been found to lower temperature by decreasing heat production and increasing heat dissipation. That it does not do this by an action on the blood seems proved by the fact that the blood is not affected by medicinal amounts. The sweating does not cause the fall, since it takes place when no sweating occurs. It may, therefore, be considered that the drug directly affects the nervous heat mechanism of the body.

KIDNEYS, TISSUE-WASTE, AND URINE.—A very large number of studies made upon man and the lower animals by competent investigators have brought about very considerable advances in our knowledge of the influence of antipyrine upon tissue waste. It is useless to burden this volume with a discussion of their methods and results, which may be found in my *Essay on Antipyretics*;[1] suffice it to say that while all observers are not agreed as to the effects produced, the deductions apparently to be drawn are that the drug diminishes the quantity of the urine excreted, and also decreases the elimination of the nitrogenous materials, or, in other words, is a conservator of the tissues of the body.

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[1] Philadelphia, 1890.

ELIMINATION.—The elimination of antipyrine goes on very rapidly indeed, and begins almost at once after its ingestion. Maragliano states that it appears in the urine in three hours after it is taken. At the fourth hour elimination is at its height, and it continues for twenty-four or thirty-six hours. According to Pavlinow, part of the antipyrine ingested is eliminated by the salivary glands.

Toxic Effects from Prolonged Use.—Under these circumstances a post-mortem examination shows intense engorgement of the brain and meninges, with a serous exudate into the cerebral ventricles. The lungs are highly congested, the spleen is small and shrivelled, and the kidneys filled with blood and slightly inflamed. The liver is not much affected, but the blood corpuscles are greatly decreased in number.

Poisoning.—The treatment of poisoning by antipyrine consists in the administration of stimulants, the maintenance of bodily heat, the use of atropine to restore the tone of the vascular system, and if cyanosis is alarming, oxygen inhalations.

Antiseptic Power.—Antipyrine exerts a very distinct antiseptic action in small amounts, delaying all forms of fermentation and preventing the growth of germs when present in large quantity.

Therapeutics.—Antipyrine is employed in medicine for two great purposes—namely, for the reduction of *fever* and the relief of *pain*. Indeed, its employment as an antipyretic is now entirely surpassed by its action as an analgesic.

As an antipyretic antipyrine should be given in a few large doses rather than frequent small ones, as a general rule, since if the fever is of any severity the latter method of administering it will be of no effect. On the other hand, too large doses may depress the temperature to a point below normal, and induce collapse. In the article on Fevers and their Treatment are indicated the affections in which the drug is best employed, these being the sthenic fevers, as a rule, or instances where excessive outbursts of fever necessitate prompt action in reducing temperature. Under these conditions, antipyrine is the best adjunct to the cold pack. In excessively *high temperature in pneumonia* it is of great value, and in *scarlet fever* and *smallpox* is of service in some instances. In *pneumonia*, as a rule, the fever indicates at first cardiac depressants rather than antipyretics. In phthisis antipyrine generally increases the sweating, produces oppression, and either fails to act at all or produces collapse by too great an effect. In *sunstroke* it frequently fails to influence the temperature.

Be the fever what it may, provided it be associated with any diseased process, antipyrine is absolutely useless so far as any influence over the course of the disease itself is concerned. It is a remedy to be used in the treatment of symptoms, not in the removal of the cause of the fever.

As an analgesic it is the peer of opium. Although the latter drug will relieve all forms of pain if it be pushed, it possesses many disadvantages not found in antipyrine. In deep-seated pains due to organic disease of the organs of the body, in inflammations and similar disturbances, antipyrine is useless. In *neuralgic* affections of all kinds it finds its sphere, particularly if the nervous trouble be rheumatic, gouty, or due to nervous depression. Under the latter circumstances it is best combined with caffein and a little bromide of potash (see Neuralgia). In *rheumatism* it will give relief in a fairly large number of cases, not only relieving the pain and fever, if it be present, but also actually modifying the disease. It seems, however, to increase sweating in acute articular rheumatism. In *gout* it is stated to have a specific curative effect upon the disease, over and above the relief of the pain. Its use in *dysmenorrhœa* has has been recommended, but its beneficial influence in such cases is doubtful. At one time it was thought that its use would relieve the *pains of labor* entirely, but this has, unfortunately, proved untrue. It may, however, be tried when the suffering is very severe in the dose of 15 grains. In the severe lancinating or darting pains of *locomotor ataxia*, and in the laryngeal and gastric crises complicating this disease, it is an invaluable and reliable remedy. Curiously enough it seems to affect acute attacks of pain in *posterior sclerosis*, but fails to control the slighter pains and muscular twitchings sometimes seen in this disease and in *myelitis*.

Antipyrine may be used hypodermically in the case of a *hypersensitive nerve* as a local anæsthetic. The anæsthesia produced by it lasts for several days, but the pain immediately after the injection is excruciating.

According to Wood and others, antipyrine is a very useful remedy in *epilepsy*.

In *malarial diseases* antipyrine certainly exercises no antiperiodic influence, although it controls the febrile paroxysms to a great extent. Yet, while this is the opinion of the majority of those who have used it, it cannot be said that every observer has reached similar conclusions. Potter reports cases where the results obtained were most satisfactory, particularly in the intermittent form of malarial poisoning. One cannot help thinking that frequently where antipyrine has been reported as acting as an antiperiodic, it has simply lowered the fever and so seemed to affect the disease.

Untoward Effects.—Aside from the results of poisonous doses, a large number of cases present slight cyanosis or duskiness of the hands and of the face about the nose and lips; the fingers may be cold and clammy, and the feet are often very cold; sweating is a very common symptom of the untoward influence of antipyrine, and pricking of the skin or tingling is not uncommonly seen. By far the largest number of these cases, however, suffer from disorders associated with the skin, and erythematous patches may be seen everywhere, more particularly on the hands and feet, and about the face, arms, and chest. Occasionally pemphigus-like spots appear, and often large bullæ have been noted as present. Elsewhere are published the statistics, collected from medical literature, of 121 cases of untoward effects exercised by antipyrine.[1] An analysis of these shows that females were much more frequently affected than males, and that the most susceptible age was decidedly that of full adult life—namely, from thirty to forty years, in both sexes. The dose causing these effects was most commonly a moderate one—either from 10 to 15 grains, or even from 4 to 10 grains. This holds good with regard to both sexes. The time of onset varied somewhat, according to whether the drug was given in one excessive dose or in frequently repeated *medicinal doses.* In other instances, however, the appearance of the symptoms was sudden rather than gradual, and as a rule the duration of the symptoms did not exceed more than one to three hours, three days being the longest time mentioned. It is interesting to note, however, that of all these cases only six proved fatal, and in these there was ample cause for death aside from any effect of the drug. We can rest assured, therefore, in ordinary cases of disease, that patients exhibiting untoward effects of antipyrine are not in any acute danger, although the symptoms may be temporarily most alarming. Typhoid fever seems, according to the statistics collected by the writer, to be the disease in which this unexpected influence manifests itself most frequently, but this may be due to the fact that it is so common a malady, and so frequently treated by means of antipyretics.

Administration.—Owing to the solubility of antipyrine it is most readily given in a little water in a wineglass or spoon. If its slight taste is disliked it may be dissolved in any one of the aromatic waters, or in syrup of bitter orange peel, or some similar vehicle. Most persons prefer to take it with ordinary water. The amount which may be given at a dose is 5 to 20 grains, 5 grains being perhaps the best dose for most cases.

Incompatibles.—When added to sweet spirit of nitre antipyrine in the course of a few moments produces a blue, changing to a dark green, color owing to the formation of iso-nitroso-antipyrine, which is not poisonous, but when in the form of a dry powder is readily oxidized on exposure to slight heat. If this color is not formed the spirit of nitre lacks its nitrous ether and is worthless, so that we have not only another incompatibility to remember, but a new means of testing the therapeutic value of all samples of sweet spirit of nitre which may be dispensed by druggists.

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[1] See my Essay on Antipyretics. Philadelphia, 1890.

APIOL.

Apiol is a yellowish, oily liquid with a specific gravity greater than water, an acid taste, and curious odor. It is derived from common parsley or *petroselinum*. So far as is known to the author, no careful study of its physiological action has ever been made, but two French observers, Joret and Homolle, state that in overdose it causes ringing in the ears, intoxication, and severe frontal headache.

Therapeutics.—Originally introduced to combat *malarial fevers*, because of a fancied resemblance in its toxic action to quinine, apiol has at last found its true level as a remedy in *amenorrhœa*, given in the dose of 2 to 3 minims three times a day for a week before the proper date for menstruation. It should be given, if possible, in capsules owing to its bad taste. It is said not to possess any abortive influences, although it is often taken with that object in view.

Apiol is imported from France in capsules containing a little less than 3 grains.

APOMORPHINE.

Apomorphine is an artificial alkaloid obtained by the action of hydrochloric acid upon morphine in a sealed tube to which is applied a high heat. It is a whitish or gray powder, made up of minute crystals, which rapidly undergoes decomposition when exposed to the air. The drug should be kept in dark bottles well stoppered. A very important point to remember is that old solutions rapidly decompose, and may produce poisonous symptoms if employed in medicine. The drug ought to be dissolved freshly each time it is used.

Physiological Action.—One of the best studies of this drug is that of Reichert, who found that in poisonous doses it produces convulsions, and finally paralysis, which is chiefly spinal in origin.

NERVOUS SYSTEM.—On the nervous centres in the brain apomorphine acts as a stimulant, but the convulsions produced by poisonous doses are probably spinal. The motor and sensory nerves are finally paralyzed, and even the muscles become poisoned and incapable of contraction.

CIRCULATION.—Apomorphine increases the rapidity and force of the pulse and raises arterial pressure when given in moderate amounts by stimulation of the accelerator nerves and the vaso-motor centre. Large doses act as circulatory depressants.

RESPIRATION.—After ordinary amounts no change in respiration occurs, but after poisonous doses the breathing becomes rapid and irregular.

VOMITING.—This is produced by a direct action of the drug upon the vomiting centre in the medulla, and not by an action on the stomach. Apomorphine is, therefore, a typical centric emetic.

Therapeutics.—Apomorphine is useful in nearly all cases where an emetic may be employed. In poisoning from other drugs, particularly depressants and narcotics, we have little knowledge of its safety, but, unless the stupor or circulatory changes are very profound, the drug may be used with care. In subacute and chronic *catarrh of the stomach and air-passages* it may be useful in getting rid of the mucus, and it is a useful remedy in bronchitis where it is necessary to excite secretion, or where the secretion which has been poured out is tough and thick.

Administration.—The drug when used as an emetic should always be given hypodermically and the solution be freshly prepared. The emetic dose is about $\frac{1}{10}$ of a grain, but as much as $\frac{1}{5}$ may be used. The expectorant dose is $\frac{1}{5}$ to $\frac{1}{10}$ of a grain by the mouth. No nausea is usually felt. The drug nearly always acts badly in children, and had better not be used in this class of patients. The salt used is *Apomorphinæ Hydrochloras, U. S.* and *B. P.* An injection (*Injectio Apomorphinæ Hypodermica*—2 grains dissolved in 100 minims of camphor-water) is officinal in the *B. P.*

ARISTOL.

Aristol is a compound of iodine and thymol, which has been introduced into medicine for the purpose of substituting iodoform. Experiments and practical clinical experience has shown that it can be used in all instances where iodoform can be applied externally, and it is said to possess the advantage of being almost entirely harmless to man, although it is a powerful parasiticide. As a dressing for the ulcers of tertiary syphilis it seems to act with remarkable rapidity, producing cicatrization with greater rapidity than does iodoform, and it has also been found of value in the treatment of lupus. Aristol may be used in the place of chrysarobin or pyrogallic acid in the treatment of psoriasis. It is best employed in the form of an ointment in the strength of $\frac{1}{2}$ to 1 drachm to the ounce of vaseline.

ARNICA.

Arnica is a medicine derived from *arnica montana*, a native plant of the Western United States and Europe. It holds a very high position in domestic medicine as a local and internal remedy in *sprains* and *bruises*, and in *hæmorrhages*, *amenorrhœa*, and similar states. Two parts of the plant are officinal, the arnica flowers (*Arnicæ Flores, U. S.*) and the root (*Arnicæ Radix, U. S., Arnicæ Rhizoma, B. P.*)

Physiological Action.—When arnica is applied to a delicate skin it produces burning and irritation, and even extensive skin lesions. According to the studies of the author it slows the pulse, raises the blood-pressure slightly, and stimulates the vagus nerves. Toxic doses produce a rapid pulse from paralysis of these nerves.[1]

Administration.—Internally it is rarely given. If it is so used the dose of the tincture (*Tinctura Arnicæ Radicis, U. S.*) is 15 to 30 drops, and the same amount of the tincture of the flowers (*Tinctura Arnicæ Florum, U. S.*) is to be used. The solid (*Extractum Arnicæ Radicis, U. S.*) and fluid extract (*Extractum Arnicæ Radicis Fluidum*) of the root are also officinal. The dose of them is 3 to 5 grains and 5 to 10 minims respectively. The plaster (*Emplastrum Arnicæ, U. S.*) is very useful for external applications.

The tincture is the preparation usually applied to sprains and bruises, and the alcohol contained therein accomplishes a large part of the good achieved.

The tincture (*Tinctura Arnicæ*), the only British preparation, is given in the dose of 30 minims to 1 drachm.

ARSENIC.

Arsenic (*Arsenicum*) itself is never employed in medicine, but it is used in the form of arsenious acid or the arseniates of sodium, potassium, or copper.

Arsenious acid is derived from arsenic-bearing ores by roasting them in a reverberatory furnace, when it rises in the form of a vapor which adheres to the walls of the furnace, and requires a second sublimation owing to the first deposit being quite impure. It is soluble in water, is without odor, and when heated gives off the smell of garlic.

Physiological Action.—The changes produced by poisonous doses in man will be found considered under the heading of Poisoning, and the writer will now confine himself to a study of the effects of medicinal amounts.

Applied to the normal skin arsenious acid produces no change of any moment whatever, but if the surface be broken or a wound or sore exists its action is very powerful, and it destroys the tissues to a considerable extent. For this reason it has been employed as a caustic by "quacks" and regular physicians, the latter using it to remove warts, condylomata, and similar growths, while the former have chiefly employed it as a "cancer cure," asserting that it would take the disease "out by the roots."

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[1] See Boston Medical and Surgical Journal, 1888.

NERVOUS SYSTEM.—When small amounts of arsenic are given to animals, particularly of the lower types, as represented by the frog, reflex action is lost long before, or more rarely at the same time that voluntary movement is put aside, and, finally, all sensation to pain produced by heat and pinching totally ceases. It is, therefore, quite evident that the sensory nervous apparatus is affected, and experiments have proved that the sensory tract of the spinal cord is at fault. Ultimately, however, the motor system also fails and complete motor palsy ensues. Arsenic acts as a depressant poison to all protoplasm with which it may come in contact. (Ringer and Murrell.) In medicinal amounts the drug acts as a nervous excitant and as a stimulant to the trophic nervous apparatus.

CIRCULATION.—In moderate amounts arsenic has little or no influence upon the circulation. Large doses cause marked decrease in the force and frequency of the pulse accompanied by a decided fall in arterial pressure, and in these amounts it is to be regarded as a distinct cardiac depressant which depresses all the heart's component parts, such as the ganglia, muscle, and nerves. The fall of the arterial pressure is due to vaso-motor depression with relaxation of the general bloodvessels, but especially those of the abdominal cavity. According to Lesser, small doses act as a cardiac stimulant, increasing pulse-rate. It is absorbed into the blood.

RESPIRATION.—In small amounts arsenic stimulates very distinctly the respiratory centre, and Lesser asserts that small doses stimulate the peripheral ends of the vagi in the lungs, but that in toxic quantities it acts as a powerful respiratory depressant.

ELIMINATION.—Arsenic escapes from the body chiefly by the kidneys and bowels. In poisoning the purging carries off much of the drug, but after medicinal amounts some traces of it may be found in the saliva and in the milk of nursing women. The writer has seen colic produced in this way in children taking milk at the breasts of women taking large doses of Fowler's solution.

TISSUE-WASTE.—According to Chittenden and Cummins, arsenic in medicinal amount distinctly decreases tissue-changes. Large doses, however, greatly increase nitrogenous breakdown.

Therapeutics.—Arsenic is used in *chorea*, in which it is almost a specific, acting in an unknown way. Small doses should be given at first and later on its dose should be rapidly increased, as patients soon get accustomed to the drug. As a tonic combined with iron it is invaluable in *malarial anæmia* and *cachexia*. In *atony of the mucous membranes* it is exceedingly useful, and in ordinary *anæmia* and *debility*, combined with a simple bitter tonic, it is invaluable. In *malaria* it acts as a prophylactic, as a cure, and as a remedy in convalescence. Next to quinine it is the best antiperiodic that we have. Where the attacks of *intermittent fever* are far apart it is useful as an antiperiodic between the paroxysms, quinine being withheld for the attack itself. In ordinary *neuralgia*, due to eye-strain or debility, it is very useful. In *gastralgia* it is of great service. The author desires to speak particularly of its employment for the improvement of *depraved mucous membranes,* as in persons who have not true tuberculosis but *phthisical tendencies*—that is, individuals who continually have colds in the head, chest, or elsewhere. The prolonged use of arsenic for months at a time will often cure these cases.

Arsenic should never be employed in "wet" skin diseases—that is, those associated with much proliferation of new cells and the exudation of serum and other liquids. Its field is in the *dry, scaly skin affections.*

Where the skin is affected in its lower layers it is useless and should be used only where the epiderm is diseased (Duhring).

In *psoriasis* it at first makes the skin more red and seemingly worse, but this passes off and the disease gets well. This is important to remember, as otherwise the drug may be stopped just at the wrong time. *Pemphigus*, *lichen*, and *lepra* all yield to its influence in most instances.

In *diabetes* and *pruritus vulvæ* the drug is said to be of value when given internally. In *gouty diabetes* the use of the carbonate of lithium and the arseniate of sodium is often of great service.

In *asthma,* particularly where the mucous membranes are at fault, it is one of the best remedies that we have, given either internally or smoked in arsenic cigarettes, which are to be made as follows:[1]

℞.—Belladonnæ folia	gr. xcvj.
Hyoscyam. folia	gr. xlv.
Stramonii folia	gr. xlv.
Extract. opii	gr. iv.
Tabaci	gr. lxxx.
Aquæ	Oj.
M.—Ft. sol. et ad	
Potas. nitrat.	gr. clx.
Potas. arsenitis	gr. cccxx.

Bibulous paper is to be wetted with this compound, and after drying is to be rolled up and smoked in a cigarette.

A more simple procedure is to wet bibulous paper in a solution of arsenite of potassium of the strength of fifteen grains to the ounce.

In *chronic rheumatism* asenic is very valuable in certain cases but often fails to be of service. In *coryza*, in *cancrum oris*, severe *sore-throat*, and *chronic nasal catarrh* it is to be employed internally, and in some cases of *hay-fever* affords undoubted relief. The use of arsenic in all stages of *phthisis* gives often the most surprising results. In *gastric cancer* and *ulcer*, given in small amounts frequently repeated, arsenic will often do good by relieving the pain and checking the vomiting. It may be tried in the *vomiting of pregnancy* with some chance of success. In *atonic dyspepsia* associated with *chronic diarrhœa*, and with evidences of *dysentery*, arsenic is of service. In small amounts it is very valuable in frequently repeated doses ($\frac{1}{100}$ of a grain every hour), in all forms of *serous diarrhœas.*

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[1] See Philadelphia Hospital Pharmacopœia.

In old persons whose *feet become swollen* and hot from prolonged standing and who have *shortness of breath* on exertion, arsenic does good.

Locally applied to *warts* and other growths of the skin for several days in the form of the *Liquor Arsenicalis* (*B. P.*), or *Liquor Acidi Arseniosi*, or of Fowler's solution, it causes the growth to drop off or to become very much loosened. Where the growth is very hard and horny its surface should be softened by the application of liquor potassa before the arsenical liquor is applied. The same plan may be used for *corns*, and salicylic acid is employed in a similar manner but is not so efficient. Where large growths with wide surfaces are to be attacked the physician must use arsenic most boldly or not at all. The danger of absorption is only escaped when the drug is used so generously as to destroy the tissues before they can carry on any absorption of the poison. Marsden recommended the use of one ounce each of arsenious acid and powdered gum acacia to five drachms of water as an application to *epitheliomatous growths.*

Administration. — Children generally stand more arsenic than adults, proportionately, and Ringer states that boys bear less than girls. The drug should generally be given after meals, as it is apt to irritate the stomach if used alone. Whenever a patient is under arsenic he should be cautioned to watch for any puffiness about the eyes, particularly in the morning on arising, and for slight laxity of the bowels and griping. These are signs that the drug should be stopped for a day or more. The swelling under the eyes may spread and amount finally to general anasarca and is due to a cellulitis at first and afterward to a true effusion.

The officinal preparations are arsenious acid (*Acidum Arseniosum, U. S.* and *B. P.*), the dose of which is $\frac{1}{40}$ to $\frac{1}{20}$ of a grain, the solution of the arsenite of potassium (*Liquor Potassii Arsenitis, U. S.; Liquor Arsenicalis, B. P.*), or Fowler's solution, the dose of which at first is from 1 to 5 drops in water; the solution of arseniate of sodium (*Liquor Sodii Arseniatis, U. S.* and *B. P.*), the dose of which is 1 to 5 drops, and the solution of arsenious acid (*Liquor Acidi Arseniosi, U. S., Liquor Arsenici Hydrochloricus, B. P.*), the dose of which is 1 to 5 drops. This is more irritant to the stomach than the other preparations. The iodide of arsenic enters into Donovan's solution (*Liquor Arsenii et Hydrargyri Iodidi, U. S.* and *B. P.*), the dose of which is 1 to 3 drops well diluted. Iodide of arsenic (*Arsenii Iodidum, U. S.* and *B. P.*) is given in $\frac{1}{36}$ grain doses, and arseniate of sodium (*Sodii Arsenias, U. S.* and *B. P.*), in the dose of $\frac{1}{30}$ to $\frac{1}{10}$ of a grain.

Acute Poisoning.—Arsenic is a gastro-intestinal irritant, producing, when taken in poisonous dose, violent vomiting and purging, with great pain in the œsophagus, stomach, and entire belly. The passages are finally watery and resemble "rice-water" stools, but are to be separated from those of cholera and antimonial poisoning by the presence of blood and by chemical analysis. The mucous membrane is stripped off the bowel and appears in shreds. Very commonly about the third day, if the patient survive so long, an intermission in the attack appears, which will only be followed by a return of all the symptoms, so that the physician must not give a favorable prognosis. In this symptom arsenical poisoning resembles phosphorus poisoning and yellow fever. Death generally occurs about the fourth or sixth day, and on or about the third day a peculiar skin eruption appears which may be of any character. In rare cases sudden pain, collapse and death take place after the ingestion of the poison. Widespread multiple neuritis may be brought on. *A typical change always present in prolonged acute poisoning is fatty degeneration of all the tissues.*

TREATMENT OF ACUTE POISONING.—Beside washing out the stomach by the stomach-pump, applying external heat and stimulants, the proper antidotes should be at once employed, and the only ones of any value are the freshly precipitated hydrated sesquioxide of iron and magnesia. The first is to be prepared by the precipitation of iron from one of its fluid preparations by the use of an alkali. Ammonia added to the tincture of the chloride of iron is efficacious, but the precipitate has to be repeatedly washed to rid it of an excess of ammonia. Magnesia is a better precipitant because it not only precipitates the iron but is an antidote itself. Monsel's solution and the so-called dialyzed iron may be employed in place of the tincture, but the Monsel's salt is too irritating and the dialyzed iron is so readily precipitated that it needs no alkali to be added, but may be given pure. Magnesia is a useful antidote of itself.

Under the name *Ferri Oxidum Hydratum cum Magnesia* the *U. S. P.* recognizes an antidote for arsenic; this is often called the "*antidotum arsenici.*"

After the use of the antidote opium should be given to allay irritation and pain, and large draughts of water be used to flush the kidneys and dilute the poison. In its later stages the danger from arsenical poisoning arises from the changes produced in vital organs.

CHRONIC POISONING shows itself in great irritation of the air-passages, in diseases of the kidneys, in pigmentation of the skin, and in nervous symptoms due to inflammations of the nervous tissues in different parts of the system, such as patches of anæsthesia and localized loss of motor power. These anæsthetic areas are generally confined to the extremities and extend only to the first or the second joint above. Arsenic often produces asthma in those exposed to it by reason of the irritation it causes in the bronchial tubes. Chronic poisoning is to be treated by withdrawal from the exposure, and the use of iodide of potassium to aid in the elimination of the arsenic.

The other symptoms are to be treated by application of electricity, tonics, out-of-door life, and such measures as will improve the general condition of the patient.

ASAFŒTIDA.

Asafœtida, U. S. and *B. P.*, is a gum obtained by making an incision into the root of the *Ferula Narthex.* It occurs in irregular masses of a dark yellow or reddish color which becomes still more red if exposed to the light and air. Asafœtida *in tears* is a term applied to the drug when it appears in the shape of drops or pearls, and is seldom seen. Its odor is penetrating, strong, and resembles that of garlic. When taken internally it causes a sensation of warmth and acts as a stimulant and carminative in the alimentary canal.

Therapeutics.—Asafœtida is used in medicine as a *carminative* which will particularly affect the lower bowel, and is useful in the *intestinal indigestion* of old persons when associated with *flatulence*, and in the flatulent *colic of children.* By way of rectal injections it is of value in the *tympanites* of children and in that of adults during *typhoid fever.* It is also used as a stimulating expectorant in the later stages of *bronchitis.* In nervous irritability of children it is often of service.

Administration.—Asafœtida is given in pills of asafœtida (*Pilulæ* (*Asafœtidæ, U. S.*), of which two or three may be taken, each one containing 3 grains; the mixture or milk of asafœtida (*Mistura Asafœtidæ, U. S.*), the dose of which is ½ to 1 ounce; and the tincture (*Tincture Asafœtidæ, U. S.* and *B. P.*), ½ to 1 fluidrachm. The suppositories contain what is equal to 40 drops of the tincture; and the plaster of asafœtida (*Emplastrum Asafœtidæ, U. S.*) is used where a faint counter-irritant and antispasmodic is needed. When intestinal indigestion and flatulence occurs in old people the following pill is of service:

℞.—Ext. nuc. vom. .	gr. v.
Ext. physostigmæ	gr. iij.
Asafœtidæ	gr. xl.

M.—Ft. in pil. No. xx. S. One night and morning.

The *B. P.* preparations not officinal in the *U. S. P.* are *Enema Asafœtidæ* and *Pilula Asafœtidæ Composita*, composed of asafœtida, galbanum, and myrrh, dose 5 to 15 grains.

AZEDARACH.

Azedarach, U. S., is the bark of the *Melia Azedarach*, or Pride of China, as it is sometimes called. It is found in Syria, Persia, and the north of India and in the southern United States.

The drug has no toxic power, and children may eat it largely without ill effect. If very large amounts are used gastro-intestinal inflammation occurs. It is employed as a remedy against the *round-worm*, and should be given in decoction made by boiling 2 ounces of the drug in a pint and a half of water till there only remains a pint of liquid. Of this from 1 to 2 tablespoonfuls are to be given a child, and repeated every two hours until the bowels are opened. It has also been used as a fluid extract prepared by the ordinary means with alcohol, to which some white sugar should be added. The dose of this is a teaspoonful, not to be repeated. The decoction is the best form in which to use the drug.

BARIUM CHLORIDE.

One of the most recent and one of the best evidences of the value of the study of the action of drugs upon the lower animals is given us by this substance. It will be remembered that Brunton and Ringer, of London; Kobert and Bary, of Dorpat; and Bartholow and the writer in America, have at various times published, during the last few years, studies concerning the effect of barium on the circulatory apparatus of the frog and dog, and that all of them are in accord in the statement that it slows the heart very greatly, steadies its rhythm, and, at the same time, increases the volume of blood thrown out of the ventricle. They have also found that barium increases blood-pressure, and Kobert has, by a series of careful experiments, concluded that it brings about this change by an action on the muscular coats of the bloodvessels.

If large doses are used in the lower animals, the heart suffers systolic arrest from over-stimulation, and the strongest irritation of the vagus nerves fails to relax the systolic contraction. Still more interesting is the statement that this failure of the vagi to inhibit the heart is not the result of paralysis of these nerves, but is simply due to the excess of cardiac contractile power. The slowing of the pulse is not due to inhibitory influence, but depends solely upon the stimulation of the heart muscle, although it would seem probable that the vaso motor stimulation, by increasing the arterial resistance, may be at least a factor in the reduction of the pulse-rate. At one time, in the dog, after large doses, there is a period of increase of pulse-rate which is asserted to be due to stimulation of the accelerator nerves.

In most works on chemistry barium is stated to be an irritant poison, but to produce such evidences of its presence the dose given must be extremely large, and many times greater than any amount useful for practical medicinal purposes.

Therapeutics.—Barium chloride may be used in all forms of *cardiac disease* in which failure of the heart muscle is evident. In *varicose veins* it is said to be of value, both when employed internally and applied locally over the distended vessels.

Administration.—The solution to be used internally should have the strength of 5 grains to the ounce of water, and of this 1 or 2 teaspoonfuls is to be given three times a day.

A point worthy of remark is the character of the pulse-wave produced. While its volume is increased it does not give that sensation of tenseness to the finger that does digitalis, and the pulse-wave seems to be very considerably prolonged; a fact that the sphygmograph also records.

BELLADONNA.

Belladonna is botanically known as *Atropia Belladonna*, and is officinal in the form of the root (*Belladonnæ Radix*, *U. S.* and *B. P.*), and leaves (*Belladonnæ Folia*, *U. S.* and *B. P.*) It belongs to a very large class of plants which all have a similar physiological action. Belladonna contains an active principle in the form of an alkaloid, known as atropin (*Atropina*, *U. S.* and *B. P.*), which is insoluble in water. The sulphate of atropin (*Atropinæ Sulphas*, *U. S.* and *B P.*) is soluble.

Physiological Effects.—In man, full medicinal doses produce flushing of the face, redness and dryness of the fauces, dilated pupils, sometimes an erythematous rash over the skin, rarely diplopia and delirium. If the dose be still larger the delirium becomes very marked and is wild and talkative. The pulse is rapid and wiry. The rash which appears resembles that of scarlet fever, but lacks the punctations. The skin may desquamate after several days if the rash is severe.

In children belladonna is usually borne very well indeed, and opium very badly. When belladonna asserts itself in children the respiration is quickened, the eyes become bright and the cheeks red, but lines of pallor reach from the malar bones to the corners of the mouth, giving the child a curious expression.

NERVOUS SYSTEM.—Belladonna acts as a powerful excitant of the brain and spinal cord.

When very large doses are given, paralysis of the spinal cord comes on, which is followed by tetanic spasms and finally by recovery. The primary loss of power is due to paralysis of the entire cord, and the second stage of convulsions to the escape of the motor and sensory pathways from the paralysis before the inhibitory centres recover. As a result any peripheral irritation causes violent explosions of motor power.[1] Even in large medicinal dose belladonna may be considered as a depressant to the motor nerves and as a quieter to the sensory filaments. On voluntary muscles the drug has no effect, but upon unstriped muscles it acts as a depressant and antispasmodic. It distinctly lessens reflex action.

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[1] If a homely simile, found useful by the writer in teaching, may be used, the inhibitory centres may be represented by a schoolmaster, and the motor and sensory centres

CIRCULATION.—Belladonna quickens the pulse by depression of the peripheral vagi and by stimulating the cardiac muscle. It produces a rise of arterial pressure by stimulating the vaso-motor centre and by the increased heart action. In poisonous doses it causes a fall of arterial pressure due to vaso-motor palsy, depression of the muscular coats of the bloodvessels and to the direct depression of the heart muscle. Sometimes when belladonna is given a primary but fleeting stage comes on, in which the pulse becomes slow.

RESPIRATION.—Atropin is a powerful stimulant to the respiratory centre in ordinary amounts. In large doses it is a depressant and paralyzant to respiration, and produces death from respiratory failure, due to paralysis of motor nerves supplying the respiratory muscles, and probably by depressing the respiratory centres.

ABDOMINAL CONTENTS.—Belladonna increases peristalsis by depressing the peripheral ends of the inhibitory fibres of the splanchnic nerves and by diminishing any tendency to spasm on the part of the muscular coats of the intestine.

ACTION OF SECRETION.—The drug decreases all the secretions of the body except the urine, which is sometimes increased in amount under its use. The decrease of secretion is due to paralysis of the peripheral nerve-filaments supplying the secretory cells of the glands.

BODILY HEAT.—When belladonna is used in large amounts there is nearly always a rise of temperature, which in children may amount to one or two degrees. In advanced poisoning the temperature rapidly falls.

ELIMINATION.—It is eliminated by the kidneys and bowels and is partly destroyed in the liver. In a suspected case of poisoning the urine may be dropped in the eye of an animal, and, if atropin has been taken, mydriasis will result.

EYE.—On the eye belladonna produces dilatation of the pupil by stimulating the sympathetic fibres of the iris and paralyzing the ocular motor fibres peripherally. It generally increases intra-ocular tension.

Therapeutics.—Belladonna is used to allay *excessive secretion*, to act as an *antispasmodic*, and to influence the circulatory apparatus where *local inflammations* are beginning, particularly in secretory glands, and in case of *shock* and *collapse*. It is also of practical value in *neuralgias* and the pains due to irritated peripheral nerves.

To check secretion in *night-sweats* it is the best remedy we have,

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by two boys. The escape of chloroform in the room paralyzes them all, but, finally, the boys recover before their master and go off as truants (convulsions); at last the master (inhibitory centres) recovers, and order, or health, is restored.

and it is useful in excessive *idiopathic ptyalism*, as seen in children, or in that due to mercurialization. In *bromidrosis of the feet* and other localized sweatings it is useful. It is the best drug to *check the secretion of milk* in an inflamed breast. Belladonna may be used in *serous diarrhœa*, which it checks by stimulation of the splanchnic vaso-motor filaments of the intestinal bloodvessels, which being relaxed cause a transudation of liquid into the bowel.

Trousseau recommends as a local remedy the use of 1 to 2 grains of the extract of belladonna with 6 to 8 grains of tannic acid in *leucorrhœa* dependent upon disease of the uterine cervix. This should be placed on a pledget of cotton and applied to the affected part daily for all day. Ringer states that if pain is also present in these cases the following injection is of value:

℞.—Sod. bicarbonat.		ʒj.
Tr. belladonnæ		f℥ij.
Aq. dest.	q.s.	Oj.

This is to be injected into the vagina, the woman being placed on her back with the buttocks raised before it is used, so that the drug may bathe the uterine cervix for some minutes.

As an antispasmodic atropin is to be used in *torticollis*, injected directly into the muscle itself, so as to act on its motor nerve fibre, and it may be given in *spasm of the intestine* with *cramps* and *griping*, while in *cramps in the legs and body*, either as a local application by means of liniments, or by its employment internally, it is of service. In *asthma* of the spasmodic type, belladonna is a sovereign remedy, particularly if it be combined with morphine. It may be used as a prophylactic or as a cure during the attack.

Belladonna leaves may be smoked by rolling them into a cigarette or putting them into a pipe. This drug is useful in *whooping-cough* at all ages and in all stages, but has generally to be given in large amounts in this disease to do any good.

In *spasm of the sphincter ani*, idiopathic or due to *fissure*, belladonna in an ointment or suppository is of value. In *spasm of the urethra and bladder* the drug may be used internally and externally, and in the former state the ointment should be smeared along the under surface of the penis every night. This treatment is also useful in *chordee*. In the *colic of hepatic and renal calculi* belladonna in full dose will nearly always give relief. Where *urinary incontinence* depends upon spasm of the bladder belladonna should be used (see Urinary Incontinence). In *dysmenorrhœa* in nervous women with spasm of the cervix uteri it is of very great value applied as an ointment or in a vaginal suppository, or when given by the mouth. For the *nervous cough of children* and adults it is the best remedy. In *constipation* it does good by depressing the inhibitory nerves of the intestine. It is also of value in *laryngismus stridulus* and in *hiccough*. In spasms from peripheral irritations it is of value.

In *iritis* it is to be used to dilate the pupil and prevent adhesions. The solution to be dropped into the eye should contain 1 to 4 grains of atropin sulphate to the ounce of water. When used to act on the circulation it is to be employed in *shock* and *collapse* from injury, or in the course of severe disease (see Shock). In *pneumonia* and *typhoid fever*, or other severe disease, belladonna should be kept in the house and pushed freely if collapse or vaso-motor relaxation suddenly asserts itself. In *mastitis*, or inflammation of the breast, even where the presence of pus is beginning to show itself, belladonna, if pushed, will give surprisingly good results if given internally and applied locally. In *sore-throat*, when the pharynx is hot and dry and has a sensation of rawness, while the capillaries appear injected and red, belladonna is often of the greatest service in full dose, aborting the "cold." In *exophthalmic goitre* belladonna is thought to act by stimulating the sympathetic nerves, and certainly gives relief in some cases. In relief of local nerve pains it is of value, and acts probably by quieting the irritated nerve. It should be applied in these cases in the form of an ointment or plaster and well rubbed into the part.

In *headache* occurring in young persons, often due to over-work, with pain in the eyeballs and forehead and a sensation as if the orbits were too small for the eyeballs, belladonna is of service. In *intercostal neuralgia* or *pleurodynia* belladonna plasters may be applied to the spot with relief.

Use of Atropin in Poisoning.—Atropin acts as an antidote in cases where poisonous mushrooms have been eaten, and is a physiological antidote to opium, calabar bean or physostigma, and jaborandi. In opium poisoning it acts as an antidote upon all parts of the body, and in jaborandi poisoning the same is true. In opium poisoning the drug should not be given after the respirations rise to ten from three or four per minute, as too much of the drug may be given and atropin poisoning may come on. The condition of the pupil is not a guide as to the effect of atropin in opium poisoning, because opium acts centrically and atropin acts peripherally on the nerves governing the iris. Atropin should be used in aconite, antimony, and hydrocyanic acid poisoning, for its influence on the vaso-motor system, the respiratory centre, and the heart, and for the purpose of maintaining the bodily heat.

Administration.—The dose of the sulphate of atropin (*Atropinæ Sulphas, U. S.* and *B. P.*), is $\frac{1}{100}$ to $\frac{1}{20}$ of a grain. The alcoholic extract (*Extractum Belladonnæ Alcoholicum, U. S.* and *B. P.*) is given in $\frac{1}{6}$ to $\frac{1}{4}$ grain doses, and the tincture (*Tinctura Belladonnæ, U. S* and *B. P.*) in the dose of 5 to 15 minims. The extract (*Extractum Belladonnæ Fluidum, U. S.*) is given in 1 to 2 minim doses, while the extract of the *B. P.* is given in $\frac{1}{4}$ to 1 minim doses. *Abstractum Belladonnæ, U. S.*, is given in the dose of 1 grain; *Succus Belladonnæ, B. P.*, is given in 5 to 15 minim doses. The preparations of the *B. P.* not officinal in the *U. S. P.* are *Liquor Atropinæ Sulphatis*, given in the dose of 1 to 6 minims, *Lamellæ Atropinæ*, each of which contains $\frac{1}{5000}$ of a grain of atropin, and *Unguentum Atropinæ*. Belladonna liniment (*Linimentum Belladonnæ*, *U. S.* and *B. P.*), Belladonna plaster (*Emplastrum Belladonnæ*, *U. S.* and *B. P.*), and the ointment (*Unguentum Belladonnæ*, *U. S.* and *B. P.*) are for external application.

BENZOATE OF BISMUTH.

This is a preparation which has been highly recommended in Germany and to a certain extent in this country within the last few months in the treatment of chancroid. Under its influence the surface of the sore heals up with great rapidity and leaves a comparatively small cicatrix. It may also be used in the treatment of all specific sores and for the dressing of indolent or sloughing ulcers. Benzoate of bismuth, when properly applied, should be preceded by a careful washing of the diseased surface with a very weak bichloride solution, after which the bismuth is to be sprinkled over the wound and the entire surface covered with cotton which should be held in place by an adhesive strip. The only disadvantage in this dressing lies in the fact that it has to be changed once or twice in every twenty-four hours. Immediately after it is applied it may produce some tingling or burning, but this is never very severe.

BENZOIN AND BENZOIC ACID.

Benzoin (*Benzoinum*, *U. S.* and *B. P.*) is a resinous balsam derived from the *Styrax Benzoin*, which is a native of Sumatra, Borneo, and Java. Benzoic acid is obtained by the sublimation of gum benzoin, and it is benzoic acid which is generally used in medicine.

Physiological Action.—Locally applied in concentrated form benzoic acid is an irritant, and taken internally in excessive amount it causes a sensation of warmth and burning. It is eliminated as hippuric acid, and increases the quantity of the acids in the urine. On the lower forms of life it acts as an antiseptic and germicide.

Therapeutics.—Benzoic acid is useful in *chronic cystitis* with alkaline urine which is loaded with phosphates, and, combined with cannabis indica, acts well in the latter stages of gonorrhœa. Senator states that in the dose of 2 or 3 drachms a day it is a specific in *acute rheumatism*, and thinks it equal to salicylic acid. When these doses are to be used the benzoate of soda should be employed, owing to its solubility. In *acute laryngitis* with great hoarseness the inhalation of steam laden with compound tincture of benzoin is of the greatest service. A tablespoonful of this tincture should be placed in a pitcher of boiling water, and a towel thrown over the head of the patient to retain the steam. It cannot be used in an atomizer, as it clogs the "tips." Internally it is useful in *chronic bronchitis*.

Administration.—The dose of benzoic acid (*Acidum Benzoicum, U. S.* and *B. P.*) is usually 10 to 40 grains, but a drachm may be given. The gum itself is never used. The tincture (*Tinctura Benzoini, U. S.*) is given in 30 minim to 1 drachm doses, and the compound tincture (*Tinctura Benzoini Compositæ, U. S.* and *B. P.*) composed of benzoin, aloes, storax, balsam of Tolu, and alcohol, the dose of which is 1 to 2 fluidrachms. The preparations officinal in the *B. P.* but not in the *U. S. P.* are the troches (*Trochisci Acidi Benzoici* and *Unguentum Cetacei*).

Adeps Benzoinatus (*U. S.* and *B. P.*), or benzoated lard, is simply a non-rancid basis for many ointments, notably that of zinc.

BICARBONATE OF POTASSIUM.

Bicarbonate of Potassium (*Potassii Bicarbonas, U. S.* and *B. P.*). This salt is used for the same purposes as the citrate and acetate of potassium, and as it is much less agreeable, should not be used when they can be obtained. The dose of *potassii bicarbonas* is 5 to 40 grains, or even as much as 2 drachms in well diluted water may be given.

BICARBONATE OF SODIUM.

Bicarbonate of Sodium (*Sodii Bicarbonas, U. S.* and *B. P.*) is a salt largely used as an antacid in *gastric fermentation*, and in *sick headaches* from this cause. Combined with calomel in powder it is supposed to add to its efficiency in increasing biliary flow, as all alkalies of this class liquefy and thin the bile. The drug has been widely employed in the treatment of *rheumatism*, and is found to be of great service to allay *pain and soreness in the joints* when used in the lotion made by dissolving it in water and applying it to the part on lint or rags. In *acidity of the stomach* the following effervescing powder is useful: Bicarbonate of sodium (*Sodii Bicarbonas*), 30 grains in one paper, and, in the other, 20 grains of tartaric acid (*Acidum Tartaricum*). These are each dissolved in half a tumbler of water, poured one into the other, and swallowed during effervescence.

BITARTRATE OF POTASH.

Potassii Bitartras, U. S., Potassii Tartras Acida, B. P. Sometimes called "cream of tartar," or acid tartrate of potash. It is a white, gritty powder which may occur in rhombic crystals. Owing to its stability it has been thought that it escaped from the body without oxidation, and so to differ from the other potash salts formed from vegetable acids. This is probably incorrect.

Therapeutics.—This is the most diuretic of the potash salts, and is used in *chronic nephritis* with gin or compound infusion of juniper, when it is very useful in removing dropsy. One ounce of the salt is added to a pint of the infusion of juniper berries, and the entire quantity taken in divided doses in twenty-four hours. In *acute renal disease* the drug should be used without the juniper. In large doses (half an ounce) it acts as a watery purge, but is rarely so used. Where the *urine is thick and alkaline* bitartrate of potash is a useful remedy to render it acid and make it clear and normal in hue.

BISMUTH.

Bismuth (*Bismuthum, B. P.*) is used in medicine as the subcarbonate (*Bismuthi Subcarbonas, U. S.*), the subnitrate (*Bismuthi Subnitras, U. S.* and *B. P.*), the citrate (*Bismuthi Citras, U. S.* and *B. P.*), and the bismuth and the ammonium citrate (*Bismuthi et Ammonii Citras, U. S.* and *B. P.*). The first and second are identical in their dose (5 to 20 grains) and action, and may be employed interchangeably. The third and fourth are more astringent and more irritating than the other two, and must be given in a smaller dose, which is 2 to 4 grains. Many years ago the drug was supposed to be capable ot producing gastro-enteritis in large doses, but this was due to a contamination by arsenic. Bismuth may produce chronic poisoning after prolonged use on wounds or when internally administered. The symptoms under these circumstances are the formation of black sloughs in the mouth and gastro-intestinal tract, desquamative nephritis, and albuminuria. The preparations of the *B. P.* not officinal in the *U. S. P.* are the *Liquor Bismuthi et Ammonii Citras*, dose ½ to 1 fluidrachm, and the troches (*Trochisci Bismuthi*), 2 grains in each. *Bismuthi Carbonas, B. P.*, is the same as the subcarbonate of the *U. S. P.*

Therapeutics.—Bismuth is used as an astringent in large doses to cover areas of *inflamed mucous membranes* and so to allay irritation. It is useful in *irritative vomiting* for this reason, and in *diarrhœa* of a similar type in which the stools are serous. If the passages are mucous, castor oil should precede bismuth in order to rid the alimentary canal of the secretion already poured out. It is very useful when combined with carbolic acid in *serous diarrhœa*, given in capsules containing 5 grains of bismuth subnitrate and 1 drop of carbolic acid (Wood). It is also to be used as a slow and feeble antacid. The *Bismuthi et Ammonii Citras* is very astringent, and should be used in *chronic serous diarrhœas* in the dose of 5 grains every two or three hours. The other preparations of bismuth are insoluble, and they should not be given in water; but this preparation is soluble, and may be given in solution. The drug is of service in *dyspepsia* where lactic and butyric acid fermentation is present with excessive belching, and may be employed in *gastralgia* and *gastric ulcer* and *gastritis* as a sedative and astringent. The salt of bismuth and ammonium citrate must never be employed if acute inflammation exist.

When the salts of bismuth are used for any length of time they cause the odor of garlic in the breath, which is due to an exceedingly slight adulteration of the drug with tellurium. The stools are apt to become black, and the tongue, if furred, may also be black about the centre when bismuth is used.

BORAX AND BORACIC ACID.

Borax, or *Sodii Boras* (*U. S.* and *B. P.*), is made by the action ot boracic or boric acid upon soda. It is soluble in twelve times its weight of water. Both borax and boracic acid have been supposed to act as efficient germicides in strong solutions, but this has been proved incorrect. They are, however, antiseptics even in weak solutions. In the form of a lotion boracic acid has been used as a remedy for *erysipelas* with a good deal of success, and it may be similarly employed in *burns* and *scalds*. Borax may also be used as a wash in *diphtheria* and in *aphthous stomatitis*, *cancrum oris*, and *gangrenous stomatitis*. Internally borax has been used in *epilepsy*, and may be tried with some slight hope of a good result. In *pruritis ani* and *vulvæ*, and in *bromidrosis* and *fœtid sweating* it is of great value. Strong solutions locally applied are useful in *tinea tonsurans* and *tinea circinata*. Boracic acid may be given internally in *cystitis* to render the urine acid, and is useful in the removal of *freckles* when applied as a wash to the skin.

It is one of the most commonly used substances in eye washes, either alone or with cocaine.

The following formula may be employed:

℞.—Cocain. hydrochlor.	gr. iv to viij.
Acid. boracic.	gr. x to xx.
Aq. destillat.	f℥ij.

M.—S. To be used in *conjunctivitis* and similar states.

Boroglyceride is a solid made by the addition of boracic acid to glycerin in the presence of heat. It is soluble in water and glycerin. Locally it is used as an antiseptic, and as a vehicle for carbolic acid, chrysarobin, and the vegetable alkaloids in skin diseases and in diseases of the eye, such as *purulent ophthalmia*.

The following makes a very elegant application for the skin of the face and hands:

℞.—Boracic acid	ʒj.
White wax	ʒj.
Paraffin.	ʒij.
Almond oil	ʒij.

S. To be thoroughly mixed and applied night and morning.

Potter recommends the following in *uric acid diathesis* where there is a tendency to the formation of stone:

℞.—Magnesii carbonat.	ʒj.
Acid. citrici.	ʒij.
Sodii biborat.	ʒij.
Aquæ bullientis	f℥viij.

S. A tablespoonful t. d.

Or,

℞.—Acid. boracic.	ʒj.
Potas. bitartrat.	ʒiv.
Aquæ	q. s. f℥x.

S. Heat together to dryness, and give 20 grains in water, well diluted, t. d.

Borated lint is made by dipping lint into a boiling, saturated solution of boracic acid or borax. It makes a simple, inexpensive, antiseptic surgical dressing, and contains nearly one-half its weight of the drug. *Glycerinum Boracis, B. P.*, and *Mel Boracis, B. P.*, are not officinal in the *U. S. P.*, but are used as local applications for chapped hands and small sores.

BRAYERA.

Brayera, U. S., Cusso, B. P., sometimes called Kousso, is derived from *Brayera Anthelmintica*, a plant of Abyssinia. It contains a volatile oil, tannic acid, and koosin or taeniin. The drug is used against the *tapeworm* and is most valuable, also possessing the advantage of safety. It should be used in an infusion (*Infusum Brayeræ*) in the dose of ½ an ounce of the powdered flowers to a pint of water, in the morning on an empty stomach (see Worms). Koosin may be used in the dose of 20 to 40 grains in capsule. The fluid extract (*Extractum Brayeræ Fluidum*) is given in the dose of ½ an ounce. It has been said that the drug is apt to cause abortion in pregnant women, but this is not known positively as a fact. This drug is officinal in the *B. P.* under the name of Cusso. *Infusum Cusso, B. P.*, is given in the dose of 4 to 8 fluidounces.

BROMIDES.

Bromides of potassium, sodium, lithium, calcium, nickel and ammonium, and Hydrobromic acid.

Bromide of Potassium.

Bromide of potassium (*Potassii Bromidum, U. S.* and *B. P.*) is the most commonly used and important member of the group first named, and will, therefore, be spoken of before the others.

It is made by the precipitation of freshly made bromide of iron by pure carbonate of potassium, or by a process more readily carried out and recommended by the *B. P.* It occurs in colorless transparent crystals which are stable in dry air, but absorb moisture in a damp atmosphere. It is very soluble in water, but less so in alcohol. This bromide has a salty taste, and is distinctly irritant to mucous membranes if locally applied in concentrated form.

Physiological Action.—Bromide of potassium has an action upon the animal economy which is clearly defined, and closely followed by all the other bromide salts, so that what is said here concerning its effects may be taken as representing the whole class of bromides, except in the instances where slight differences exist, which will be pointed out under the various names of the respective salts.

NERVOUS SYSTEM.—The bromide of potash acts as a distinct depressant to the motor and intellectual portions of the cortex cerebri. It slows the development of thought and decreases the excitability and power of the motor cells. (Albertoni.) Upon the spinal cord it acts as a marked sedative, affecting chiefly the sensory tracts, and causing thereby loss of reflex action and a decrease in the ability of the animal to recognize pain. It also depresses to a less extent the motor pathways in the cord. Motion is maintained after sensations to pain and reflexes are lost. The drug depresses the peripheral parts of the sensory nerves, and, in very large doses, the motor nerves and muscles are similarly involved.

CIRCULATION.—If the drug be injected in ordinary dose into the jugular vein it causes at once a fall of arterial pressure and pulse-rate. These changes are due to a direct action of the bromine and the potassium upon the heart itself. When given to man in therapeutic doses by the mouth its circulatory effect is so slight as not to be worthy of consideration.

RESPIRATION.—Bromide of potassium is a depressant to the respiratory centre in toxic dose. In medicinal dose it does not affect the breathing except where the doses are large and persistently administered, when the breathing becomes slower.

TEMPERATURE.—No effect upon this function is noted, unless the dose be enormous; when this is the case the bodily heat is progressively diminished, and the fall of temperature is probably due to the circulatory and nervous depression produced, associated with the general failure in vital power.

ELIMINATION.—The drug escapes very slowly with all the secretions, and is found in the sweat, urine, tears, semen, milk, and feces.

Tissue-waste is decreased.

Therapeutics.—From what has been already said it is evident that bromide of potassium is a remedy to be devoted almost entirely to the treatment of diseases of the nervous system, and its uses are therefore as various as the manifestions of perversion of nervous action can be various. In a word, it may be said that bromide of potash is to be used wherever *over-excitement of nervous protoplasm* is present, but never where nervous symptoms are due to depression.

In *epilepsy*, which, to the best of our knowledge, is due to explosive impulses arising in the cerebral cortex, it is the best drug we have, and in all forms of minor spasm, due to heightened reflex activity, it is of service. In *spasmodic contractions*, for *hysterical females*, in *nervous startings* and alarm at sudden noises in adults and children, and in the nervous symptoms accompanying *pregnancy* and the *menopause*, it will be found of great value. The following prescription is recommended very highly by Goodell, and will be found of service in these states:

℞.—Ammon. bromid.	ʒ ij.
Potas. bromid.	ʒ iv.
Spts. ammon. aromat.	fʒ vj.
Aq. camphoræ . . . . . q. s. ad	f℥ vj.

M.—S. A dessertspoonful to a tablespoonful every four hours.

In *headaches* due to uterine trouble the pain is often felt at the top of the skull or at the back of the neck near the occiput. The cause of this trouble will often be found to be in the *cervix uteri*, and alleviation can only be obtained when the uterus is treated and the bromides administered.

In *convulsions* in children and adults, combined with chloral, bromides are most efficient, and are sometimes of service in *incontinence of urine* due to vesical spasm. In *seminal emissions* due to a morbid excitability of the centres in the spinal cord, bromide of potassium is one of the best remedies we have, and in *satyriasis* and *nymphomania* it is of great service.

In cases where undue *irritability of the pharynx* and larynx prevents examination of those parts, one or two full doses will render an examination easy of performance by decreasing the local reflex activity. This is a useful point to be remembered in relation to the treatment of pharyngeal and laryngeal disease.

The bromides are found to be of service in the *laryngeal crises* of locomotor ataxia, and the explanation of this fact is as follows: The adductor centre of the larynx is situated in the brain, and the abductor centre in the spinal cord. The first closes the larynx, the second opens it, and in health they maintain a patulous tube by their opposition. In disease the spinal centre (the abductor or opener) fails, and the adductor in the brain being unopposed, produces closure of the tube with disastrous results. The bromide, by quieting reflex action, as well as the adductor centre in the cerebral cortex, prevents this accident.

In *whooping-cough* with much mucous exudation the drug is rarely of benefit and had better not be used. If *laryngismus stridulus* or any form of spasm depending upon local irritation, the local trouble must, of course, be removed if possible. In *teething* the drug may be used to decrease the reflex irritation and prevent convulsions, and it will decrease the *night-screaming* of children—which is often due to bad dreams—to a very extraordinary degree, even if the dose be quite small. As a soporific for the insane, and in the *insomnia* of the overworked and that of nervous women, the bromide of potassium is of great service. It may also be employed with good results in *chronic alcoholism* and *morphiomania*. In *migraine* and *neuralgia* due to eye-strain or other nerve strain, combined with caffeine the bromide is almost a specific. The caffeine seems to stimulate the depressed nerve up to the normal level, and the bromide to deaden the perception of the pain. The following is a most valuable remedy in migraine and even in sick headache. It ought not to be used in bilious headache, which will be made worse by it:

A liquid
with solids
may be ad[illegible]

℞.—Antipyrine	gr. xxv.
Caffein. citrat.	gr. x.
Potas. bromid.	gr. xxv.
Acid. phosphoric	gr. xxv.

M.—Ft. in chart No. v. S. One powder as needed.

In *dysmenorrhœa* and *menorrhagia*, particularly in young subjects, the bromides are also of service (see Dr. Goodell's prescription, p. 83). When the flow is too great at such a period the drug should be begun a week before the expected epoch, and kept up in the dose of 5 to 10 grains night and morning. In cases where the epochs follow one another too closely the drug should be used continuously. After an apparent cure ensues the drug should be used for a few periods to avoid a relapse. In *sea-sickness* the bromides are the best prophylactics we possess, and should be used in the dose of 5 to 10 grains three times a day for several days before sailing in order to quiet the vomiting centre. After sea-sickness begins they should not be given in ordinary solutions but in an effervescing draught made as follows:

℞.—Acid. citric.	ʒij.
Aq. dest.	f℥iv.

M.—Ft. sol.

℞.—Potas. brom.	ʒj.
Potas. bicarb.	ʒj.
Aq. dest..	f℥iv.

M.—Ft. sol. A tablespoonful of each of these solutions should be added to one another and taken during effervescence.

This prescription will also be found of value in the persistent *vomiting of pregnancy* and in that following prolonged etherization, or other states. If the vomiting is excessive the dose ought to be reduced to 2 teaspoonfuls of each solution and be given every half-hour until half of each mixture is taken or the patient relieved. In cases where this will not act rectal injections of the following will be found of value:

℞.—Potas. brom.	gr. xxx.
Tinct. opii deodorat.	gtt. xxx.
Aq. amyli	f℥vj.

M.—S. To be injected gently into the empty rectum and retained as long as possible.

This method is the most reliable plan that can be followed.

Bromide of potassium may be used to prevent the symptoms of *cinchonism* after quinine and salicylic acid, and it is said to prevent the nausea and depression so apt to follow the use of opium.

Administration.—The dose of bromide of potash is from 5 to 60 grains a day.

Use of Bromides in Poisoning.—Bromides are useful in all convulsive attacks consequent upon the ingestion of poisons, except those due to cardiac sedatives which alter the circulation at the base of the brain, and may be used to allay any nervous symptoms which are of an excited nature, to prevent excessive vomiting, to produce sleep, and to quiet delirium.

Effects of Prolonged Use.—After the drug has been used for some time acne appears about the face and extends over the entire body, the breath becomes fœtid, the patient dull, expressionless, and heavy, remaining buried in sleep for nearly every hour of the day. During this time he can be aroused, but at once falls to sleep again. The walk becomes weak and feeble, the movements slow and painfully prolonged. Taste is lost and hearing is benumbed, while the brain is almost blank. Loss of sexual power is an early symptom. The acne may be put aside by the use of arsenic; where bromides are used to any extent in women this drug should always be given simultaneously to prevent the eruption. As Fowler's solution is compatible with the bromide in solution, it is the best form of arsenic to employ.

Bromide of Ammonium.

Bromide of Ammonium (*Ammonii Bromidum, U. S.* and *B. P.*). This salt is far more stimulating than the bromide of potassium, and it is certainly much more irritating. The dose is the same as the potash salt—5 to 60 grains a day. Da Costa has recommended it highly in rheumatism in large doses well diluted.

Bromide of Calcium.

Calcium Bromide (*Calcii Bromidum, U. S.*) was introduced into medicine as a nervous sedative and hypnotic, and was thought at one time to be an efficient substitute for the bromide of potassium. Its action on the nervous system is virtually identical with that of the potash salt, and it has been found to be far less irritant and depressant than the latter. For some unknown reason it has never won the confidence of the profession, but it may be given with very good results in the dose of from 30 to 90 grains a day, or even more in cases which are not readily affected by bromides. It is employed especially in *hysteria* and *epilepsy,* and in all the conditions in which the other bromide salts are indicated. It is sometimes of value combined with the potash salt, since under such circumstances better results are often gained than if one drug alone is employed.

Bromide of Lithium.

Bromide of Lithium (*Lithii Bromidum, U. S.*). This is much weaker than the other salts, and may be given in larger dose. Dr. S. Weir Mitchell states that it is of value in epilepsy after the potash salt fails. The dose is 30 to 90 grains a day.

Bromide of Nickel.

This is a green salt quite irritant to the stomach. It should be given well diluted, or in an effervescing draught, as it is apt to disorder the stomach if used in concentrated form.

Bromide of Sodium.

Bromide of Sodium (*Sodii Bromidum, U. S.* and *B. P.*). This salt is to be used in every instance where bromide of potassium can be employed. Its dose is the same, although it is asserted to be a little weaker physiologically, grain for grain, than the potash salt. It is far less apt to disorder the stomach, and is not so generally depressant as is the bromide of potassium.

Hydrobromic Acid.

Hydrobromic Acid is an extremely irritant preparation, but is thought to be less apt to cause acne and other untoward effects than the other bromides. It is only to be used in the form of the officinal dilute acid (*Acidum Hydrobromicum Dilutum*, *U. S.* and *B. P.*), and to be given in the dose of from one drachm to half an ounce well diluted with sweetened water. It is highly recommended for *headaches* due to eye-strain in nervous women by De Schweinitz and others.

BROMINE.

Bromine (*U. S.* and *B. P.*) is a dark-red liquid of an excessively pungent odor like that of chlorine, and possesses very extraordinary power as a caustic when applied to the tissues of the body. It is the most severe caustic we possess, and penetrates very deeply. It should be applied in *hospital gangrene* and other large *sloughs*, by means of a glass rod.

BUCHU.

Buchu (*U. S.*) is derived from *Barosma Betulina*, a plant of Africa, and contains a volatile oil, which is probably the active principle, and a bitter extractive. It is officinal, under the name of *Buchu Folia*, in the *B. P.*

Therapeutics.—Buchu is used as a diuretic when it is desired to affect the mucous membranes of the genito-urinary tract which are chronically diseased, and particularly when these parts are below their normal tone. It does not increase the urinary flow to any great extent, but acts on the genito-urinary passages. It is useful in *pyelitis*, *cystitis*, and *vesical irritation* of the chronic type. If the urine is highly acid, muddy, laden with salts, and productive of incontinence by reason of irritation, buchu in the form of the fluid extract, in the dose of a teaspoonful three times a day combined with an equal amount of sweet spirit of nitre, will be of great service. For a child the dose should be about ten to thirty minims. If the vesical irritation is acute buchu is contra-indicated.

Administration.—The fluid extract (*Extractum Buchu Fluidum*, *U. S.*) is the only preparation officinal, and should be always well diluted before it is given, in the dose, to an adult, of 1 drachm three times a day. The infusion is not officinal, and is made by adding one ounce of leaves to a pint of water. The dose of this is a tablespoonful to two tablespoonfuls. The officinal *B. P.* preparations are the infusion (*Infusum Buchu*), dose 1 to 4 fluidounces, and the tincture (*Tinctura Buchu*), dose 1 to 2 fluidrachms.

CAFFEIN.

Caffein (*Caffeina*, *U. S.* and *B. P.*) is an alkaloid derived from the berries of *Caffea Arabica*, which also contain, upon roasting, an empyreumatic oil. Caffein is usually employed in medicine as the citrate, and is soluble in 75 parts of water.[1]

Physiological Action.—On the nervous system caffein acts as a stimulant of a rapidly acting nature exerting its chief influence on the brain and spinal cord. By its cerebral effect it causes increased rapidity of thought, and by its influence on the spinal cord it increases reflex activity, and for this reason is said to make people "nervous." It is important to remember that it has no effect on brain protoplasm except to stimulate it, and that ultimately a brain driven along by caffein breaks down by the concentration of its energy for the time being in one effort. In poisonous doses it causes tetanic convulsions in the frog by an action on the spinal cord, and if applied directly to a muscle, causes it to contract spastically. It does not affect the motor nerves.

CIRCULATION. — Caffein augments the pulse-rate and blood-pressure by stimulating the heart muscle, but sometimes causes a decrease in arterial pressure. Clinically it certainly seems to raise the blood-pressure in almost every instance where it is used.

KIDNEYS, TISSUE-WASTE, AND ELIMINATION.—Caffein increases diuresis by a direct stimulation of the secretory epithelium of the kidney, and therefore increases the amount of solids as well as of the liquids in the urine. Upon tissue-waste the drug evidently acts as a depressant, and is therefore a conservator of the tissues. It is burnt up in the body.

The empyreumatic oil, of which there is about one teaspoonful in each well-made breakfast cup of coffee, has physiological effects somewhat different from those of caffein (Marshall and Hare). It is probably the cause of the "biliousness" sometimes produced by coffee, due to the faulty digestion of this oil, which is apt to disorder the digestion when taken alone.

Therapeutics—Caffein is a valuable *cardiac stimulant* and tonic as well as a *renal stimulant*. It acts equally well in *cardiac* and *renal dropsies* for this reason, and is an invaluable remedy in such cases. In acute Bright's disease it is contra-indicated, because all stimulants are contra-indicated in acute inflammations. In *opium poisoning*, owing to its stimulant effect on the respiratory centre, it is very valuable, and it may then be given in the form of strong black coffee, and will aid in keeping the patient awake and also add heat to the body, which is often lacking. A cup of strong black coffee is often useful in a paroxysm of *asthma*. In *headache* due to nerve-strain, caffein combined with antipyrine and one of the bromides is of the greatest service (see Neuralgia). So useful is it in cardiac disease as to have largely supplanted digitalis in the hands of some practitioners.

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[1] Thein, derived from tea, caffein, the active principle of coffee, and the alkaloid or quarana from South America, are chemically identical. Much of the caffein of commerce is really thein, although it is claimed that pure thein has a very different physiological action.

Caffeinæ Citras, U. S. and *B. P.*, cannot be used hypodermically, owing to its decomposition in the presence of water. The following may, however, be used hypodermically: Salicylate of soda, 30 parts; caffein, 40 parts; and distilled water, 60 parts.

OIL OF CAJUPUT.

Oil of Cajuput (*Oleum Cajuputi, U. S.* and *B. P.*) is a volatile oil distilled from *Melaleuca Cajuputi*, a tree of the Molucca Islands. It is a stimulant, and in large amounts an irritant, to mucous membranes, and acts as an efficient *carminative* and *parasiticide*. As a remedy for *tinea tonsurans* and pediculi it should be applied pure to the part affected. It is capable of irritating the skin. In *diarrhœa* of a serous type it is of value in the dose of 10 to 20 drops (see Diarrhœa). *Spiritus Cajuputi* is officinal in the *B. P.*; dose, ½ to 1 fluidrachm.

CALCIUM.

Calcium is officinal in a number of forms, and is to be distinctly separated in the mind of the student from calx or lime, which is an oxide of calcium. It is never employed as calcium, but as one of its salts. These are as follows: Bromide of calcium (*Calcii Bromidum, U. S.*), precipitated carbonate of calcium (*Calcii Carbonas Precipitatus, U. S., Calcii Carbonas Precipitata, B. P.*), chloride of calcium (*Calcii Chloridum, U. S.* and *B. P.*), hypophosphite of calcium (*Calcii Hypophosphis, U. S.* and *B. P.*), and as precipitated phosphate of calcium (*Calcii Phosphas Precipitatus, U. S., Calcii Phosphas Precipitata, B. P.*).

All salts of calcium are incompatible with acids. Calcium sulphate is not officinal. The precipitated carbonate of calcium is used in the treatment of *serous diarrhœa*, and as an *antacid* and as a *local protective* in cases of *chapped skin* or *intertrigo*, particularly in young children. When given internally the dose is from 10 to 30 grains, but by far the best method for its administration is in the employment of chalk mixture (*Mistura Cretæ, U. S.* and *B. P.*), which contains about 30 grains of the chalk to each ounce of liquid. The dose of this mixture is from a teaspoonful for a young child to an ounce for an adult. In cases of *diarrhœa* it is best given in combination with tincture of kino or the compound tincture of catechu and paregoric, in some such form as follows:

℞.—Tr. kino	f℥j.
Tr. catechu comp. . . .	f℥ij.
Misturæ cretæ . . . q. s.	f℥vj.

M.—S. A dessertspoonful every three hours till diarrhœa ceases.

It is to be remembered that the chalk mixture acts very slightly as an astringent, and chiefly as an antacid and mechanical agent in the alimentary canal.

Precipitated carbonate of calcium is the slowest *antacid* which we possess, and for this reason is the remedy to be employed in acidity of the intestines, as it passes through the stomach to a very great extent unchanged. (For the varieties of diarrhœa in which it is to be used see article on Diarrhœa.) As an external application it is used in *sweating of the feet* and hands, and sometimes as a dry dressing to *ulcers*. It may also be used over *burns*.

Calcium chloride, when taken internally in any amount, acts as an intense gastro-intestinal irritant, and may produce death by this means. It is to be distinctly separated from the chlorinate or chloride of lime, with which it is sometimes confused, for the latter is nothing more than hydrate of lime or slaked lime, containing 25 per cent. of chlorine, while chloride of calcium is a hard, vitreous, friable substance, giving off no odor of chlorine and utterly different in its use, action, and appearance.

Chloride of calcium is used in medicine by some physicians in *scrofulous enlargements of glands* in the neck and elsewhere, and is even said to cause calcification and encysting of *tubercular nodules*. In cases where *deficient bone formation* is evident it often does good, but the other salts of lime, such as the hypophosphates, are better. In cases where *boils* mature slowly a poultice made by adding a solution of chloride of lime to the mass may be used to hasten suppuration. The dose is 5 to 30 grains, best given in a solution made by adding water in the proportion of 1 drachm to each 5 grains of the drug.

The hypophosphite of calcium and the precipitated phosphate of calcium are used for the same purposes, generally in the form of the *Syrupus Hypophosphitum, U. S.*, and the *Syrupus Calcii Lactophosphatis, U. S.*

The large amount of phosphate of calcium in the bones and tissues renders it a useful drug where the tissues are starved of their proper proportions of salts, and its use has been found, in animals, to cause a great increase in bony growth, not only in the earthy but also in the animal constituents of the osseous tissues. The hypophosphite has a similar effect.

In *rickets* and in *fractures* where the bone is slow in uniting, and in some cases of *phthisis* and *scrofula*, the lactophosphates and hypophosphites are of service. In *dental caries*, particularly that occurring in nursing women, and in the *anæmias* of this class of patients, they are useful. In *general debility* and *nervous prostration* they are often of great value, and may even be used with benefit in chronic and atonic diseases of the skin and mucous membranes. In cases of *hepatic torpor* they may be used with advantage.

The lactophosphates are better than the hypophosphites, as the latter are probably changed into phosphates in the stomach as soon as they enter this viscus. The only advantage which they possess over phosphorus itself is that they afford an easy method of administration, and also that they contain calcium. The dose of either of the two drugs is 10 to 30 grains three times a day, or, of the syrups just named, a teaspoonful to a tablespoonful.

Sulphate of calcium is not to be confounded with sulphide of calcium. The latter remedy, which was first used by Sidney Ringer, is a very useful preparation in the treatment of *boils*, both as a remedy to hurry on the "pointing" of the boil and to prevent the formation of others. The dose of calcium sulphide or calx sulphurata is $\frac{1}{10}$ grain.

Prepared chalk (*Creta Preparata*, *U. S.* and *B. P.*) is given in the dose of 20 to 60 grains. Other preparations are compound chalk powder (*Pulvis Cretæ Compositus*, *U. S.*), dose 10 to 60 grains, troches of chalk (*Trochisci Cretæ*, *U. S.*). Preparations officinal in the *B. P.*, but not in the *U. S. P.*, are aromatic powder of chalk (*Pulvis Cretæ Aromaticus*), dose 10 to 60 grains, (*Pulvis Cretæ Aromaticus cum Opii*), dose 10 to 60 grains.

CALUMBA.

Calumba, Columbo, or Columba, is the root of the *Cocculus Palmatus*, a climbing plant of Mozambique. Its taste is bitter, and its odor is slightly aromatic. Two alkaloids are found in it, berberin and columbin, and a third substance known as columbic acid. Calumba is one of the purest bitters known.

Therapeutics.—This is one of the best simple tonics which can be used, owing to its lack of astringent effect and to its favorable action on mucous membranes.

In cases of *gastro-intestinal atony*, particularly that following fevers and similar states, calumba will be found of service, and it is a valuable remedy in the convalescent stages of *summer complaint* and *serous diarrhœas*. The following prescription of Dr. George B. Wood is very useful in these states when they are associated with flatulence:

℞.—Calumbæ pulv.	℥ss.
Zingiber. pulv.	ʒss.
Sennæ fol.	ʒj.
Aq. bullientis	Oj.

M.—Ft. in infusio. S. A wineglassful t. d.

Administration.—The fluid extract (*Extractum Calumbæ Fluidum, U. S.*) is given in the dose of 15 to 60 minims; the tincture (*Tinctura Calumbæ, U. S.*), dose 1 to 4 fluidrachms. The dose of the extract (*Extractum Calumbæ, B. P.*) is 2 to 10 grains; the infusion (*Infusum Calumbæ, B. P.*) 1 to 2 fluidounces, and the tincture (*Tinctura Calumbæ, B. P.*) ½ to 2 fluidrachms.

CALX.

Calx, or lime, or oxide of calcium, is an alkaline earth which is incompatible with acids, ammoniacal and metallic bases, borates, alkaline carbonates, and astringent vegetable infusions.

Therapeutics.—Lime is used for the purpose of acting as an escharotic, particularly on *old ulcers* and on *hairy growths* It is never given internally, except in the form of the hydrate or slaked lime. As an escharotic application lime is used in the officinal caustic *Potassa cum Calce.* When given internally it should always be used as Liquor Calcis (*U. S.* and *B. P.*) or lime-water, and under these circumstances it acts as an *antacid*, as an aid to the digestion of milk by preventing too rapid and solid coagulation of the casein, and by exciting an increased gastric secretion. It is also feebly astringent. Given to infants and nursing women it is probably utilized in the body in the formation of bone. It is also of value in *diabetes*, in the *uric acid diathesis*, and in the excessive *nausea* and *vomiting* very often seen in adults and children. Teaspoonful doses of milk and lime-water, equal parts, will often be retained when nothing else will remain in the stomach.

The dose of lime-water is a teaspoonful to 1 ounce or even 2 ounces. Externally applied lime-water is of value in *tinea capitis* and similar states, and it is the best application in *burns*, when it is to be mixed with equal parts of linseed or olive oil, forming the *Linimentum Calcis, U. S.* and *B. P.*, or carron oil. As a local application in *membranous croup* and *diphtheria* lime-water has a high reputation and is believed to dissolve the membrane. It may be used as a spray or by means of a swab.

Liquor Calcis or lime-water is to be made by adding a piece of unslaked lime as large as a walnut to 2 quarts of boiled and filtered water in an earthen jar; after stirring it thoroughly allow it to settle, and pour off the clear liquid into a bottle. More water may then be added to the lime until it is all used.

Sulphurated lime (*Calx Sulphurata, U. S.* and *B. P.*), useful to check inflammation and hasten suppuration; the dose is $\frac{1}{10}$ of a grain. The preparations of the *B. P.* that are not officinal in the *U. S.* are the saccharated solution of lime (*Liquor Calcis Saccharatus*), dose 15 to 60 minims, and slaked lime (*Calcii Hydras*) used in different preparations.

CAMPHOR.

Camphor (*Camphora, U. S.* and *B. P.*) is derived from the *Cinnomomum* or *Taurus Camphora*, which grows chiefly in China and Japan. The camphor used in the drug stores is in reality refined camphor, and is so obtained by repeated sublimation. It is a volatile, irritant gum or resin, producing a burning taste and possessing a peculiar odor, soluble in one thousand parts of cold water and in one part of strong alcohol. Camphor is so volatile that if allowed to remain exposed to the air for any time it rapidly loses its bulk and eventually disappears. It is an exceedingly combustible substance, burning with a flame and much smoke. It may be white or pinkish in color.

Physiological Action.—If taken in large amount camphor produces epileptiform convulsions preceded by vertigo, roaring in the ears, and delirium. The pulse soon becomes rapid, feeble, and running, and the skin livid, cold, and covered with sweat. Great heat and burning may be felt in the belly, and if the poisoning be slow, evidences of gastro-intestinal and renal inflammation ensue. In small doses it acts as a stimulant and adds a sensation of warmth to the stomach, while the pulse may become more rapid and stronger under its influence. At the same time there is a sedation of the nervous system and a general feeling of contentment. In large medicinal dose camphor is thought by some to act as a sexual stimulant and by others as a sexual sedative. The stimulant effect is probably only due to doses large enough to produce irritation of the genito-urinary tract. The convulsions following poisonous doses are cerebral in origin, and the drug, although greatly broken up in the body, is eliminated by the kidneys as campho-glycuric acid and escapes by the breath and perspiration.

Therapeutics. INTERNAL USE.—Camphor is employed for the purpose of acting as a *nervous sedative* and *antispasmodic* in nervous women and children, and as a *carminative* in persons who suffer from *intestinal flatulence*. It is of value in nervous *dysmenorrhœa* and *headache*, and is best combined with one of the new analgesics, such as antipyrine and antifebrin given in pill form. As it is virtually a volatile oil, so far as its physiological action is concerned, it will be found useful in *cholera morbus* and all forms of *serous diarrhœa*, but never in mucous diarrhœa (see Diarrhœa). In *chordee*, combined with bromides and similar depressants to the spinal cord, camphor is of great service in some cases, particularly late in the disease. In *adynamic fevers* it has been used as a diffusible stimulant by Graves and others with great success. In *hiccough* it is of great service, and in *cardiac palpitation* due to functional irritability it is found of value. In *capillary bronchitis* and *catarrh* of the air-passages it will be found of service in old or atonic cases. It is also of value as a *mouth-wash* in persons who have fœtid breath.

External Use.—Externally camphor may be used as a stimulant to *indolent sores*, and as a useful addition in small amount to the precipitated carbonate of calcium as a dusting powder in *intertrigo*. In the form of a liniment camphor is used over *inflamed joints* from *sprains* or *rheumatism*, and in *myalgia* and *neuralgia* to relieve the pain and stiffness.

Camphor may be inhaled or taken internally in cases of *cold in the head* with great relief and a decided influence in aborting the attack. After the attack is in full force it is useless, but used early it will decrease the *frontal headache* and the *sneezing* and running at the nose. In *coryza* from unknown causes with much lachrymation and incessant sneezing, camphor will be found of benefit. It may be snuffed up the nostril in a fine powder or put in boiling water and the fumes inhaled. The spirit may also be inhaled from a handkerchief.

Camphorated alcohol, spirit of camphor, is a useful abortive application over *boils*, in their formative stage, two or three times a day, for a few moments at a time. Following these applications the skin should be dried and camphorated oil be applied. Ringer and Tilt both recommend Eau de Cologne saturated with camphor rubbed into the head in the *drowsiness and headache of the menopause*, and a lotion of equal parts of aqua ammonia and spirit of camphor dabbed on the painful spots of hyperæsthesia at the top of the head so commonly felt at the change of life or during menstruation.

Administration.—Camphor is used internally in the form of the camphor water (*Aqua Camphoræ*, *U. S.* and *B. P.*), dose, ½ to 2 fluidounces; the spirit of camphor (*Spiritus Camphoræ*, *U. S.* and *B. P.*), dose, ½ a fluidrachm, or in the form of the camphor itself, in pill, in the dose of 1 to 3 grains in each pill. The best preparation for internal use is the spirit, or the camphor in pill form.

For external use we have officinal the Camphor Liniment (*Linimentum Camphoræ*, *U. S.* and *B. P.*), and the Soap Liniment, or *Linimentum Saponis*, *U. S.* and *B. P.*, which is the mildest of the two. *Ceratum Camphoræ* is also officinal. A compound tincture of camphor (*Tinctura Camphoræ Composita*), composed of opium, benzoic acid, camphor, and oil of anise, is officinal in the *B. P.*, dose, 15 minims to 1 fluidrachm. *Linimentum Camphoræ Compositum*, *B. P.*, is composed of camphor, rectified spirit, and stronger ammonia.

CAMPHOR MONOBROMATE.

Monobromate of Camphor (*Camphora Monobromata*, *U. S.*). This drug is made by heating together in a sealed tube camphor and bromine. It occurs in colorless crystals or scales, and has a mild taste resembling camphor. It is almost entirely insoluble in water, but freely soluble in alcohol, ether, and chloroform.

Physiological Action. — It possesses powers partaking of the bromides and of camphor. In the frog it causes loss of reflex action and motor palsy and death by respiratory failure, and in warm-blooded animals violent convulsions, Cheyne-Stokes respirations, muscular tremblings and weakness come on. The pulse is at first more rapid than normal, then slow and weak, and death comes in coma or in the convulsions.

Therapeutics.—Monobromated camphor will generally be found most useful in combination with other drugs in pain, such as lumbago or that due to nervous disturbances. If used in *hysterical females* it will often produce sleep, and is of value to those who are addicted to the camphor-habit, as it acts as a hypnotic and warms the stomach. Like camphor itself, it is a gastric irritant, and should not be employed where gastritis exists. It has been used in *spermatorrhœa* with great success, and in *delirium tremens* has been found of benefit in cases where the gastric mucous membrane is depressed and the nervous twitchings are troublesome. In *whooping-cough* it may be tried, and has even been used in *chorea*, *epilepsy*, and *petit mal*.

Administration.—It should never be used hypodermically as it is too irritating, but administered 5 grains t. d. in pill or in an emulsion made by dissolving it in six times its weight of expressed oil of almonds and then forming an emulsion with gum arabic and water in the usual manner.

CAMPHORIC ACID.

Camphoric Acid is made by the oxidation of camphor through the influence of acids, and has been used in the night-sweats of phthisis with considerable success. Whether it is sufficiently valuable to obtain a permanent place in the treatment of this troublesome condition we do not know, as it has not been tried for a long enough period to render a decision possible.

In cases where ordinary remedies fail it may be resorted to in the dose of from 20 to 30 grains taken an hour or two before the sweat is expected. In very obstinate cases as much as 60 grains should be given, but in these cases it should be used in two separate doses of 30 grains each, two hours apart, in order to avoid irritating the stomach. It is best given in capsule.

CANNABIS INDICA.

Indian Hemp (*Cannabis Indica, U. S.* and *B. P.*). *Cannabis Indica* and *Americana* are the two forms in which this drug appears, but it is only the Cannabis Indica which is generally used in medicine. They are to be distinctly separated from American, Indian or Canada hemp, which is *Apocynum Cannabinum*, and which is an intense irritant and drastic.

Physiological Action.—In full dose to man this drug causes exhilaration, and periods of constant laughter at the slightest cause, the person seeming convulsed with merriment; in other cases the sensations are disagreeable, and even death may seem imminent to the deranged mind. Often the sensation of very full breathing comes on, and the patient thinks he is about to burst with the inflation of his lungs. After this deep sleep appears, lasting for many hours, even as much as fourteen or fifteen, without any awakening. If the dose be very large the respirations are slowed very considerably, but no case of death from its use in man is on record, and enormous amounts have been given to the lower animals without causing a lethal effect.[1] Locally applied it acts as a very severe irritant and then as a local anæsthetic, but the primary effect is so powerful as to prevent its use locally in pain.

One of the most constant and pressing symptoms in poisoning in man is the marked sensation of prolongation of time so that minutes seem like hours, and, in addition to this, a peculiar separation of the mental powers during which both hemispheres of the brain seem to think differently on the same subject.

Therapeutics.—Cannabis indica is one of the best adjuncts to cough mixtures that we possess, as it quiets the *tickling in the throat* and yet does not constipate or depress as does morphine. In advanced *phthisis* it is justifiable to keep the patient constantly in a state of euthanasia by its use. For the relief of *pain*, particularly that depending on nerve disturbance, it is very valuable. Before the introduction of antipyrine and its congeners, tincture of gelsemium and the tincture or extract of cannabis indica were our best remedies in *migraine*. The gelsemium should be given in full dose, 20 drops of the tincture, and be followed by 10 to 20 of the fluid extract of cannabis indica. In true *migraine* with hemianopsia this treatment is often most effectual in aborting the attack. The prevention of further attacks is to be attained by the use of smaller amounts of the cannabis indica during the intervals; the gelsemium being only used at the onset of the symptoms. In *paralysis agitans* cannabis indica may be used to quiet the tremors, and in *spasm of the bladder*, due to cystitis or nervousness, it often gives great relief. In *impotence*,, not dependent upon organic disease, it is said to be of value combined with strychnine, or nux vomica, or ergot.

In *headaches* at the menopause cannabis indica is useful, and, if the headaches are associated with constipation, iron and aloes should be given simultaneously, particularly if anæmia is present. In *whooping-cough* and *asthma* it sometimes proves of service.

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[1] The author has injected as much as 5 drachms of a fluid extract, active in the dose of 10 minims to man, into the jugular vein of a small dog without producing death for many hours.

In *uterine subinvolution, chronic inflammation and irritation* cannabis indica is of great value, and has been found of service in *metrorrhagia* and *nervous and spasmodic dysmenorrhœa.* Not only does it relieve the pain, but seems to act well on the muscular fibres of the uterus.

In *acute* and *chronic Bright's disease* cannabis indica often allays the painful sensations over the renal region, and has been recommended by some writers in the cases where bloody urine is present. In *gonorrhœa* it is said to decrease the discharge and prevent *chordee,* and has supplanted the use of copaiba and cubebs in some practitioners' hands. It should not be used in the early stages of gonorrhœa, but in the subacute stage.

There is some foundation for the belief that small doses act as a *sexual stimulant.* The advantages possessed by it are its lack of constipative power, its freedom from after-depression and nausea, its happy effect in some cases, and an increase rather than a decrease of the appetite.

Administration.—The employment of this most valuable remedy is handicapped by its frequent lack of power—a fault which is largely dependent upon its preparation. That prepared by Parke, Davis & Company and the solid extract of McKesson & Robbins have proved efficacious in my hands for a number of years. The physician should always employ some preparation known by him to be active by personal trial before condemning the drug as a failure in a given case.

The dose of the solid extract (*Extractum Cannabis Indicæ, U. S.* and *B. P.*) is from ¼ to ½ grain, that of the fluid extract (*Extractum Cannabis Indicæ Fluidum, U. S.*) from 4 to 20 minims, and that of the tincture (*Tinctura Cannabis Indicæ, U. S.* and *B. P.*) from 15 minims to 1 drachm.

CANTHARIS.

Cantharis (*U. S.* and *B. P.*), or "Spanish Fly," is really a beetle known as the *cantharis vesicatoria,* and as such appears with an iridescent covering or wing-sheaths of a bluish or greenish hue. They come chiefly from Spain, Italy and Sicily, and from the southern parts of Russia. Those from Russia are supposed to be the best. According to Leidy, the vesicating substance is in the blood, the eggs, and the secretions of the generative apparatus. This substance contains cantharidin as an active principle, but cantharidin is not medicinally employed.

Physiological Action.—The ingestion of a moderate dose of cantharides only produces slight stimulation of the genito-urinary system, particularly the kidneys and urinary tracts. Large amounts produce great pain in the lumbar region, burning in the entire bladder and urethra, priapism, agonizing vesical tenesmus, widespread acute nephritis, bloody urine, which is scanty and finally suppressed, and great irritation of the external openings of the genito-urinary apparatus. The inflammatory changes may cause sloughing of the penis or of the labiæ in the female.

Violent gastro-enteritis is nearly always a pressing condition. The drug has no true aphrodisiac influence except in toxic dose. A diagnostic sign of cantharidal poisoning, where the beetles have been swallowed, is the iridescent pieces of the wings and coats which appear in the vomit. Thirst is always a prominent symptom.

Therapeutics.—Cantharides are employed internally and externally. When given by the mouth the tincture is used as a *uterine stimulant* to affect the uterine mucous membrane and relieve *amenorrhœa* in cases where atony and depression are the cause of the suppression. Some persons teach that the tincture of cantharides is a valuable remedy in small doses in the second stage of acute *desquamative nephritis*, but in the instances where the writer has seen it used it has made matters much worse although it is supposed to decrease the quantity of the albumin and blood. In the later stages where the kidneys are relaxed and torpid or where *albuminuria* comes on on the slightest exertion, cantharides in the doses of one drop of the tincture three times a day is of service.

In cases of *chronic nephritis*, particularly where alcoholism is the cause of the disease and the kidney is inactive, cantharidal tincture is very useful. In *pyelitis* and in *chronic cystitis* it is of service, and it has been recommended very highly in drop doses in irritability of the bladder in women and children. In these cases the bladder must not be inflamed, but irritable from depression. The use of cantharides is of value in *incontinence of urine* of a minor degree, as that occurring on coughing, sneezing or laughing in some elderly or nervous females, and will often prove of service after many years of suffering. In *chordee* in the dose of one drop twice or thrice daily it is of service. For *impotence* depending upon *sexual excess* Ringer asserts that the use of twenty or thirty drops of the tincture of cantharides with full doses of the tincture of the chloride of iron and nux vomica will often relieve the patient and enable him to beget children. In *gleet* of a very chronic type and in *prostatorrhœa* it is of service. Dermatologists have used cantharides internally as a remedy in *psoriasis*, *eczema*, *lichen* and *prurigo*, with asserted great success. The dose should be so small as not to irritate the stomach.

Externally cantharides are used in the production of vesication for the purpose of withdrawing water from a small area, or as a *counter-irritant* of some severity in cases of *deep-seated inflammations* (see Counter-irritation). Care should be taken that a sufficient amount of the drug be not absorbed to cause strangury and renal irritation. In renal *congestions* and *inflammations* the use of cantharides as a counter-irritant is often contra-indicated for this reason. In the proportion of one drop of the tincture to forty of water it is said to be a very good application for *burns*, but how it acts is not known.

Administration.—The dose of the tincture (*Tinctura Cantharidis*, *U. S.* and *B. P.*) is from one to twenty drops, and it is the only preparation used internally. The cerate (*Ceratum Cantharidis*, *U. S.*) is used as a blister spread upon a rag, and the cerate of the extract *Ceratum Extracti Cantharidis*, *U. S.*), is used for the same purposes and in the same manner. The Cantharidal Collodion (*Collodium cum Cantharide*, *U. S.*) is a method of applying the blister which is most cleanly, but there is more danger from absorption if it is used. The collodion acts as a protective to the part. The papers of cantharides (*Charta Cantharidis*, *U. S.* and *B. P.*) are used as blisters, but are weak in action. The liniment of cantharides (*Linimentum Cantharidis*, *U. S.*) is employed as a counter-irritant.

"Warming plaster" (*Emplastrum Picis cum Cantharide*, *U. S.*) is a mild counter-irritant to be employed where a blister is too severe. The preparations of the *B. P.*, other than those named, are *Acetum Cantharidis*, *Charta Epispastica*, *Emplastrum Calefaciens*, *Emplastrum Cantharidis*, *Liquor Epispasticus* and *Unguentum Cantharidis.*

CAPSICUM.

Capsicum (*U. S.*) (*Capsici Fructus*, *B. P.*), or Cayenne pepper, is the fruit of *Capsicum fastigiatum*, a native of tropical Africa and of Central America. It occurs in long ovoid pods which, when ripe, are scarlet red and possess a very hot, burning taste. The active principle is capsicin, which is a dark, reddish liquid, or, in other words, is a volatile alkaloid.

Physiological Action.—Locally applied to the skin or mucous membranes capsicum causes great redness, and, finally, in the case of mucous membranes, vesication. The alkaloid will also produce these changes in the skin. When used internally for any length of time in excess capsicum will cause a chronic or subacute gastritis with pain and discomfort over the seat of the liver and stomach. If single large doses are used renal irritation and inflammation ensue with strangury and high-colored urine. It is said to act as a circulatory stimulant.

Therapeutics.—In cases of *atony of the stomach* due to general *debility*, errors in diet, and *alcoholism* of the chronic type, capsicum is one of the best remedies we have. In cases of *acute alcoholism* the gastric mucous membrane is often irritated too much to permit of its use, but after the lapse of some days it may be found of benefit to increase the appetite. As a remedy for alcoholism it is quite useful since by its stimulating effect and hot sensation it often satisfies, at least to some degree, the craving for liquor. Under these circumstances it should be used in the dose of 5 to 10 drops of the tincture every four or five hours, or as the oleoresin in pill in the dose of ½ to 1 grain. The following prescription has been found of great service in the wards under the writer's charge at St. Agnes's Hospital in these cases:

℞.—Tr. capsici	f ʒij.
Tr. opii deodorat.	f ʒj.
Spt. æther. nitrosi	f ʒij.
Spt lavendulæ	f ʒvj.

M.—S. Dessertspoonful every four or five hours.

In the *flatulent colic* of old persons and young adults capsicum will be found not only to act as a carminative but also to prevent the development of the gas. In *low fevers* it has been used as a diffusible stimulant, but it is of doubtful value. It is rather in the *anorexia* of convalescence that capsicum acts most favorably. In *chronic nephritis* it is of considerable service and it checks *albuminuria*, but it is only to be used in the chronic forms and stages. The tincture is to be given under these circumstances in the dose of twenty drops or less, but in some cases, which are very chronic, as much as forty drops may be used. In *sore-throat* and *simple tonsillitis* the tincture of capsicum and glycerin, half and half, are very useful as a local application applied by means of a swab. The same preparation may be used as a gargle in *relaxed uvula* and *sore-throat*. Applied externally capsicum acts as a counter-irritant, producing redness of the skin, but not a blister in the ordinary individual. It is one of the best moderate counter-irritants which can be used, and it may be employed by saturating blotting-paper, time and time again, allowing it to dry between each dip, in the tincture of caspicum. This paper should finally be placed when warm and wet over the part and held closely to the skin by a compress. Capsicum plaster (*Emplastrum Capsici, U. S.*) is useful in *lumbago*, *rheumatism*, and in *headache*, applied to the nape of the neck. The tincture is sometimes painted over chilblains which are unbroken. The following method given by Ringer, from Rheims, is very efficacious in this annoying affection:

"Make a strong tincture of capsicum pods by steeping them for several days in a warm place, in twice their weight of rectified spirits of wine. Dissolve gum arabic in water to about the consistence of treacle. Add to this an equal quantity of the tincture, stirring together with a small brush, or a large camel's-hair pencil, until they are well incorporated. The mixture will be cloudy and opaque. Take sheets of silk or tissue paper; give them, with the brush, a coat of the mixture; let them dry, and then give another.

Let that dry, and if the surface is shining, there is enough of the peppered gum; if not, give a third coat. This paper should be applied in the same way as court-plaster to chilblains that are not broken, and burns that are not blistered, and speedily relieves the itching and pain. It acts like a charm and effects a rapid cure. The same is true of discolored bruises. It likewise allays rheumatic pains in the joints."

The dose of capsicum is 1 to 2 grains in powder, on food or in pill. The dose of the tincture of capsicum (*Tinctura Capsici, U. S.* and *B. P.*) is 10 to 30 drops, and of the oleoresin (*Oleoresina Capsici, U. S.*), $\frac{1}{4}$ to $\frac{1}{2}$ grain. The dose of the fluid extract (*Extractum Capsici Fluidum, U. S.*) is 1 to 3 minims. The plaster (*Emplastrum Capsici, U. S.*) is useful for external applications.

CARBOLIC ACID.

Carbolic Acid (*Acidum Carbolicum, U. S.* and *B. P.*) is also known as Phenol, Phenylic Alcohol, and Phenic Acid. Not only is it an acid, but in addition it is an alcohol of the peculiar group known as the phenols, which are derived from coal tar by a process of distillation.

It has a peculiar characteristic odor and varies in color according to its method of preparation and purity. It is soluble in 20 per cent. of water, but is liquefied by the addition of 6 per cent. of water.

If the crystals be exposed to the air they undergo liquefaction, and in consequence the purest carbolic acid is usually prescribed in drop doses rather than grains. It is soluble in alcohol, ether, chloroform, glycerin, and most oils. It unites with alkaline bases to form salts, carbolates, but these are very readily decomposed by the feeblest acids, such as carbonic acid.

Physiological Action.—Locally applied, carbolic acid produces at first a burning over the skin, accompanied by a diffuse reddening of the surface. If the solution be very strong the part at once becomes temporarily painful, then bleached and numb, so that tactile sensibility is destroyed. Applied to mucous membrane it causes similar changes, but to a more marked degree, and may even act as a moderately severe caustic of a superficial type. Owing to the local coagulation of albumin produced by it, it cannot penetrate very deeply.

NERVOUS SYSTEM.—Carbolic acid acts as a depressant and paralyzant to the peripheral sensory nerves when locally applied. Upon the higher centres in the brain the acid produces a condition of depression and stupor.

The convulsions which sometimes occur after toxic doses are spinal in origin, as they occur after section of the spinal cord. The motor nerves escape almost untouched, as do also the muscles.

CIRCULATION.—Upon the circulation in the higher animals the drug exercises a distinct depressant influence, stopping the heart in diastole in lethal dose and paralyzing the vaso-motor centre even before the cardiac muscle is affected. These changes only follow lethal doses. Small medicinal doses have no effect of any moment on the circulation.

RESPIRATION.—After large doses the breathing becomes more rapid and full. These changes, according to Salkowski and others, are due to stimulation of the respiratory centres and the peripheral vagi. Lethal doses almost invariably kill by failure of respiration due to depression of the centres.

TEMPERATURE.—Carbolic acid acts as a depressant to normal bodily temperature even in medicinal dose, and also decreases the bodily heat in fever. It lowers fever by diminishing heat production and increasing heat dissipation. (Hare.)

KIDNEYS AND ELIMINATION.—In overdose the kidneys may become so irritated that total urinary suppression may occur. Carbolic acid causes the urine, under such circumstances, to become brownish-black, owing to the manner in which it is eliminated, namely, as a sulphocarbolate, formed by its uniting with the sulphates in the body. It is also eliminated as glyco-uronic acid, and is partly burnt up in the body.

It is to be distinctly understood that the dark urine of carbolic-acid poisoning is not due to the presence of blood or any of its educts.

Poisoning, Prolonged and Acute.—As the changes in the tissues of the body produced by prolonged and sudden over-use of carbolic acid are identical they may be considered together.

Carbolic acid is one of the most rapidly acting poisons known to man, notwithstanding the fact that few people seem to realize this fact. If a large lethal dose be swallowed a man may drop dead within a few feet of the spot where he stood when drinking it, or may perhaps live a few hours. In cases where death has occurred suddenly, the cause has been failure of respiration. If the patient does not die at once all the evidences of gastro-enteritis come on. Violent vomiting and purging may ensue and burning pain in the entire abdomen is a prominent symptom. The skin is wet with sweat, the face pinched and anxious. Collapse, with a thready, imperceptible pulse and extreme dyspnœa, may be present. The mouth and lips may not smell of the drug, but the mucous membrane will be seen to be corrugated and stained black if impure acid has been taken, or whitish if the pure drug has been used. The eschar on the membranes is a peculiar one, and is pathognomonic of the poison, having a white centre surrounded by a reddened and inflamed zone, the centre sometimes becoming dark-brown or black. The post-mortem will show these spots in the œsophagus and stomach, and even in the intestines; and all the internal organs, as the brain, kidneys, liver, and spleen, will be found filled by dark grumous blood, while on opening the body the strong odor of the acid will be perceived. A peculiar croupous exudate is sometimes found in the bronchial tubes, and fatty degeneration of a more or less widespread type is often seen in carbolic-acid poisoning.

A large number of cases are on record in which carbolic-acid poisoning ensued from absorption from surgical dressings. One of the earliest signs of such a state of affairs is the darkened smoky urine and a slight nervous unrest or cerebral disturbance. Very often pain in the lumbar region indicates kidney strain and irritation. The dressings should, of course, be at once removed.

Treatment of Poisoning.—The chemical antidote is any soluble sulphate, such as Epsom or Glauber salts, which form insoluble sulpho-carbolates. As these salts follow the acid into the bloodvessels and tissues to unite with it, the mere fact that hours have elapsed since the poison has been taken does not invalidate the propriety of using these sulphates. The further treatment consists in the administration of warm mucilaginous drinks, hot applications to the extremities, cardiac and respiratory stimulants, such as digitalis and strychnine, and counter-irritation over the abdomen. Emetics and the stomach-pump should be used if possible, but the former are generally useless because of the state of the stomach.

Therapeutics.—Internally carbolic acid is little used, but, nevertheless, has a very favorable effect in certain states. In *nervous vomiting*, or in that due to *gastric irritation*, the drug does good in ½ to 2 drop doses by depressing the sensory nerves in the stomach.

In *diarrhœa* depending upon fermentation, from 2 to 5 drops of the acid do great good, combined with 10 to 20 grains of bismuth and administered in powder or in capsule.

In *gangrene* and *tuberculosis of the lung* a spray of the acid in water in the strength of 5 to 15 drops to the ounce may do some good and at least stop the *cough* and relieve the irritation and *tickling in the throat*.[1] Creasote is, however, generally preferred in these conditions at the present time.

Externally the acid is very largely employed as an antiseptic lotion, and in a solution in which to place instruments while operating. The solutions for this purpose should be in the proportion of 1 to 20 of water (see Antiseptics).

Carbolic acid is rarely used directly over *wounds* in dressings at this time, unless the dressing be one of carbolized oil. Other drugs have supplanted it. The use of the carbolized spray over wounds has been found of more harm than good, and ought never to be used. In *diphtheria*, *ulcerated sore-throat*, and even in ordinary *stomatitis*, carbolic acid will be found of value in a spray or mouth-wash, and in ordinary *sore-throat*, in the strength of 1 to 100, will be found, when applied on a swab or by a gargle, to relieve the pain and inflammation. In *burns* carbolized sweet-oil in the proportion of 1 drachm of the acid to each 6 ounces makes one of the best dressings that can be used. By means of the local anæsthesia produced by the acid minor operations, such as *eversion of the toe-nail* or opening a *felon*, may be performed by soaking the part for ten minutes in a solution of 30 parts to 100 and applying the pure acid by means of a brush to the line of the incision. Carbolic acid may be used as a lotion in the *itching of jaundice* in the proportion of 10 grains of the acid to 2 drachms of glycerin and 2 drachms of water. In *enlarged glands* which have not yet gone on to *suppuration*, intra-glandular injections with a hypodermic needle are of value in a large number of cases, the solution used being no weaker or stronger than 2 per cent. 5 to 10 minims of this solution is sufficient for each gland. In buboes 10 minims of a solution of 8 grains to the ounce may be injected into the swelling, the skin being first benumbed by an ether spray. This is a most successful treatment. The same treatment may be applied to *chronic synovitis* and repeated every three days, and *boils* and *carbuncles* may even be so treated with great success if the measure be used early enough to abort the trouble.

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[1] The spray must be a very fine one, or it will not carry the drug far enough down into the lungs to do any good.

In the form of an ointment carbolic acid may be used in the strength of 10 minims to the ounce of simple cerate, particularly in *subacute eczema* where there is great weeping and itching.

As a *disinfectant* carbolic acid ranks among the poorest of those which stand well with the popular idea; 1 to 2 per cent. solutions, however, kill most spores and germs.

Administration.—Carbolic acid ointment (*Unguentum Acidi Carbolici*, *U. S.* and *B. P.*) is the only officinal preparation in the *U. S. P.* In the *B. P.* the following preparations are officinal: *Acidum Carbolicum Liquefactum*, given in the dose of 1 to 2 minims; *Glycerinum Acidi Carbolici*, and *Suppositoria Acidi Carbolici cum Sapone;* each suppository containing 1 grain of carbolic acid.

CARBON: CHARCOAL.

Carbo Ligni (*U. S.* and *B. P.*), or Charcoal, is prepared by the exposure of soft wood to a red heat, air being prevented from coming in contact with it during the process. Charcoal should be a black, brittle, somewhat shiny, porous substance, devoid of taste, of odor, and completely insoluble in water. Owing to its power of absorbing a very large amount of certain gases, it is of value in medicine in states where these gases abound.

Therapeutics.—Charcoal is used externally as an application to *old sores* or *sloughs* to act as a *deodorant* and *antiseptic*. This is accomplished by the absorption of the liquids, thereby depriving germs of a nidus, and by its distinct oxidizing power. It may be applied in the form of a dry powder or in a poultice, which is, however, so uncleanly that other antiseptic dressings are better.

The poultice (*Cataplasma Carbonis, B. P.*), if used, should be made made in the following manner: Take of powdered wood-charcoal ½ ounce, bread-crumbs 2 ounces, linseed meal 1½ ounces, and add boiling water 10 fluidounces. Macerate the bread-crumbs and meal for ten minutes over the fire, and then stir in the charcoal to the extent of half the amount just named. Spread out the poultice and sprinkle the remaining half of the charcoal over its surface, and apply to the part affected while hot.

Internally, charcoal is used in powder in many conditions, and does very well indeed in cases of so-called "*sour stomach*," from which eructations of gas or sour liquids take place. As ordinary charcoal is not always obtainable, it may be substituted by pieces of very thin toast burnt to a state of charcoal, through and through. A few of these pieces will, when eaten, often stop all the symptoms mentioned. If the attack is very severe and vomiting eventually ensues, the ejecta will commonly be found to be odorless and not sour, and the stools will also be almost odorless, though black. In *fermentative and acid diarrhœas* in children and adults this method of treatment is often of value.

As a filter for impure water, charcoal, in mass or in powder, is one of most satisfactory substances we have.

CARBON BISULPHIDE.

Carbonei Bisulphidum, U. S., is a clear, colorless, highly refractive liquid, having a strong characteristic odor, a sharp aromatic taste, and a neutral reaction.

Poisoning.—The symptoms of poisoning by bisulphide of carbon consist in headache and nervous excitement resembling in many respects the symptoms of belladonna poisoning, particularly in the volubility of the patient and the evidences of hysterical tendencies.

Prolonged exposure to the fumes of this drug causes great cachexia and pallor, accompanied by muscular weakness and failure of intellectual power. Sometimes convulsions of an epileptiform character come on.

The treatment of poisoning by bisulphide of carbon consists in quieting the nervous system if convulsive disorders are present, by the use of bromide of potassium and chloral, and in supporting the circulatory system if any evidences of its failure manifest themselves. Circulatory depression is not, however, a common condition except in very advanced poisoning.

Therapeutics.—Bisulphide of carbon has been used in medicine externally over enlarged lymphatic glands. The application is made by placing the liquid in a bottle of such a size that the mouth is large enough to cover the diseased area. In the bottle should be placed a sponge large enough to contain a fluidrachm of the drug, and the skin over the gland should be well moistened with water.

The vapor derived from the drug under these circumstances is an active agent in promoting a cure. Bisulphide of carbon has also been used in a similar manner in the treatment of neuralgia.

CARBONATE OF POTASSIUM.

Carbonate of Potassium (*Potassii Carbonas, U. S.* and *B. P.*). This salt is never used in medicine, except to prepare other salts, as it is disagreeable to the taste and an irritant (see Potassium Citrate).

CARBONATE OF ZINC.

Precipitated Carbonate of Zinc (*Zinci Carbonas Precipitatus, U. S., Zinci Carbonas, B. P.*) is used as a protective, rather astringent, powder, over *weeping eczema* and similar moist discharges. It may be employed to fulfil all the indications for the oxide of zinc. At one time it was very largely used, not as the precipitated carbonate, but as the impure carbonate, under the name of calamine.

CASCARA SAGRADA.

Cascara Sagrada is the bark of the *Rhamnus Purshiana*, a plant growing in California. It is sometimes called California buckthorn, to distinguish it from ordinary buckthorn, or *Rhamnus Frangula*, which it closely resembles in many ways, and which may be used as a substitute for cascara sagrada.

Therapeutics.—Cascara sagrada ought never to be used as a purge but solely as a laxative. It is by far the best remedy when employed to simply empty the bowel of fæcal matter in cases of *constipation*, since it not only performs this function without intestinal disturbance, but simultaneously acts as a tonic to the bowel, and so prevents the constipation which usually follows the use of all other drugs of its class.

Though unofficinal it is most commonly employed in this country in the form of the fluid extract (*Extractum Cascaræ Sagradæ Liquidum*, *B. P.*) in the dose of from 10 to 20 drops at night, or morning and night. If 20 drops fail to act 30 drops may be used, but if larger doses are required other drugs should be employed, as fluidrachm doses have been known to act as an irritant and produce enteritis and intestinal catarrh. The objection to cascara sagrada is its bitter taste, which may be partially overcome by the additional use of the Elixir Aurantii, in the proportion of 1 part of the cascara extract to 2 parts of the orange peel.

Some of the preparations are now made in an almost tasteless form, such as "Cascara Cordial," or the non-bitter fluid extract, made by a prominent firm in this country. The solid extract (*Extractum Cascaræ Sagradæ*) is officinal in the *B. P.*, and given in the dose of 2 to 8 grains in pill.

CARDAMOM.

Cardamom (*Cardamomum, U. S.*) is the fruit of *Elettaria Cardamomum*, and is a bitter tonic possessing some aromatic properties. It is useful in cases of *atony of the stomach and small intestine*, particularly if combined with some other bitter, such as gentian, and a mineral acid. Cardamom is officinal in the *B. P.* as *Cardamomi Semina.*

If the intestine is atonic and secretion is deficient, the following prescription will be found of value:

℞.—Acid. nitric. dil. . . . . fʒj.
Tr. cardamomi comp. . . . . . q. s. f℥vj.
M.—S. Dessertspoonful after each meal.[1]

Administration.—The officinal preparations are the tincture of cardamoms (*Tinctura Cardamomi, U. S.*), dose 1 to 3 drachms; and the compound tincture (*Tinctura Cardamomi Composita, U. S.* and *B P.*), which is to be given in the same dose as the tincture. It is also a constituent of the officinal aromatic powder (*Pulvis Aromaticus, U. S.*).

CASSIA FISTULA.

Cassia Fistula, U. S., is the fruit of *Cassia Fistula*, or Purging Cassia, as it is sometimes called, and occurs in long, dark-brown pods containing a dark pulp in each segment. This pulp is the useful part of the drug, and is officinal in the *B. P.* as *Cassiæ Pulpa.* It ought never to be used alone, as it is too apt to cause pain and griping, but it is officinally present in the Confection of Senna (*Confectio Sennæ, U. S.* and *B. P.*), and may be given in the dose of ½ drachm to 1 drachm as a laxative, or as much as ½ ounce if a purgative effect is desired.

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[1] While the rule that an acid is incompatible with a tincture is not recognized in this mixture, the quantities of acid and alcohol are so disproportionate that no ether of any amount is developed.

CASTOR OIL.

Castor Oil (*Oleum Ricini, U. S.* and *B. P.*) is a fixed oil, derived by expression from the beans of *Ricinus Communis*, a plant of the United States and elsewhere, but originally derived from India. It contains an acrid substance, ricinoleic acid.

Physiological Action.—The manner in which castor oil purges is somewhat in doubt, but is probably dependent upon the presence of the acid just named and the fact that it is an oil.

As is well known, oils, such as olive oil, for example, if given in any quantity tend to move the bowels, and the ricinoleic acid, which is somewhat acrid, stimulates the small and large gut, and so developes peristaltic movement. According to some writers, this acid is not set free until the oil is attacked by the pancreatic juice. That this acid possesses purgative properties of itself seems proved by the fact that the oil will purge when it is rubbed in by the skin, and that nursing mothers on taking the oil eliminate the acid in the milk so that the suckling is purged. According to the studies of Rutherford and Vignal, the oil has no effect over biliary secretion other than that violent purgation indirectly increases biliary flow, and the researches of Hess have shown that the oil acts more rapidly in the small than in the large gut, and only produces peristalsis by coming in contact with the mucous membrane.

Therapeutics.—Castor oil is the blandest and most unirritating purge we have except the sulphate of magnesium, which is depletant and much more rapid in its effects. While the Epsom salts will act in one-half to one hour if the stomach be empty, castor oil will generally act in four hours, or perhaps five. The regularity of its action can almost be used as a timepiece, so constant is it. Castor oil is used whenever irritant materials, such as bad food, putrid flesh, or decaying or green vegetables have been eaten, even if the inflammation set up after them is very active. If hard bodies, such as broken cherry-stones, have been swallowed, it is far better than sulphate of magnesium, as it is more gentle and lubricates the gut, thereby preventing scraping and irritation. Where mucus has accumulated in the bowel in children, and must be gotten rid of before other treatment is resorted to, castor oil should be used. In *parturition* it has been used largely to relieve the bowels of fæcal matter, and is said by old practitioners to make the labor easier than if any other purge is employed. It is also employed in the *constipation* following acute diseases, and in infants and children.

The disadvantages of castor oil lie in its taste, the fact that it is oily, that it tends to produce hæmorrhoids if used constantly, and finally that its frequent use, or even a single dose, is generally followed by more obstinate constipation than before. This is one of the reasons why it is useful in irritative diarrhœas. The effect of castor oil is very much increased if a little bicarbonate of sodium be given with it.

Administration.—Castor oil is very much more agreeable to the taste if pure than if poorly prepared. It is also true that too great purity, so far as taste is concerned, renders it less active.

The methods directed for taking castor oil are as various as the tastes of the individuals. Its odor may be covered by a drop or two of the oil of bitter almonds, but emulsions of the oil are not of any service, save to prevent its efficiency. Some take the oil in the foam of beer or porter, others in syrup of sarsaparilla and soda-water, and still others in milk or cream. A good way of taking it is to eat one or two strong cream peppermint drops, or even the crystalline drops, swallow the oil from a spoon which is placed well back in the mouth, and immediately eat several other peppermints. The same plan is bettered by using the oil in milk or water, so that the liquid carries the oil down into the œsophagus without touching the mucous membranes. It may also be taken in highly seasoned beef-tea. Ringer recommends the following: ½ ounce of oil, fresh syrup of acacia 3 drachms, and distilled water 5 drachms, flavored with a little oil of lemon or peppermint. Wood advises that it be mixed with glycerin, equal parts, to which is added a drop or two of oil of gaultheria or oil of cinnamon.

The dose for an infant is 1 to 2 teaspoonfuls, and for an adult ½ ounce to 1 ounce.

Owing to the fact that the oil will very frequently produce griping, a few drops of laudanum should be added to it, or tincture of belladonna may be used. If these cannot be employed, a drop of oil of cinnamon is equally useful for this purpose.

CATECHU.

Catechu (*U. S.*) is derived as an extract from *Acacia Catechu*. The catechu of the *U. S. P.* is true catechu; that of the *B. P.* is in reality an extract of gambier, being derived from the leaves and shoots of *Uncaria Gambier*. Catechu depends for its medicinal value upon the astringent properties which it possesses. Beyond this power it has no particular value.

It is of a dark-red color, has a somewhat sweetish taste, and is soluble, like most extracts, in water.

Therapeutics.—Like all the vegetable astringents catechu is used as a remedy for *diarrhœa*, particularly that of the serous type, or that consisting of stools of too fluid a consistency. If large amounts of mucus in the passages show a catarrhal state of the bowel, the mucus should be displaced by a purge of castor oil or sulphate of magnesium before the astringent is used.

Catechu may or may not be combined with opium in cases of diarrhœa, but the following prescription will be found of service:

For an adult:

℞.—Tinct. catechu composit.		f℥ij.
Tinct. opii. camphoratæ		f℥ij.
Mist. cretæ	q. s.	f℥ij.

M.—S. Dessertspoonful every 4 hours till relieved. To be shaken before using.

In cases of *sore-throat*, where the secretion is excessive and the inflammation subacute, catechu may be used as a gargle.

In cases of *spongy gums* catechu is sometimes useful as a mouth-wash. If the powdered catechu is used internally the dose is 2 to 30 grains. The dose of the Compound Tincture of Catechu (*Tinctura Catechu Composita, U. S.*) is 1 to 2 fluidrachms. The Troches of Catechu (*Trochisci Catechu, U. S.* and *B. P.*) are to be employed in sore-throat and are to be held in the mouth. They are not generally used.

The officinal preparations of the *B. P.* beside the ones given are: *Infusum Catechu*, given in the dose of 1 to 1½ fluidounces; the tincture (*Tinctura Catechu*), dose 1 to 2 fluidrachms, and a compound powder (*Pulvis Catechu Compositus*), composed of catechu, kino, and rhatany, the dose of which is 20 to 40 grains.

CAUSTIC POTASH.

Caustic Potash (*Potassa, U. S., Potassa Caustica, B. P.*) is a very deliquescent hard white solid, possessing powerful caustic powers, and used in medicine for the purpose of burning away *growths* or *exuberant ulcers*. A piece should be placed on the skin by means of a pair of forceps, when it at once softens down and burns the tissues until it can reach no further. The surrounding skin should be protected by wax, suet or oils, and a piece of adhesive plaster with a hole for the growth should first be applied to prevent any action on the healthy tissues. This is a very painful burn and should not generally be resorted to. When the caustic has acted sufficiently it is to be washed off with vinegar or other dilute acid. Vienna paste (*Potassa cum Calce, U. S.*) is used for the same purposes as the caustic potash.

CAUSTIC SODA.

Caustic soda (*Soda, U. S., Soda Caustica, B. P.*) is milder than caustic potash, and is more readily controlled. It should be used in the same way for the same purposes, and the surrounding skin protected by adhesive plaster and oil or ointment.

It must be kept in well-stoppered bottles made of hard strong glass. The only officinal preparation in the *U. S. P.* is *Liquor Sodæ*, or solution of soda.

CERIUM OXALATE.

Cerium oxalate (*Cerii Oxalas, U. S.* and *B. P.*) is a white granular powder, permanent when exposed to the air, odorless and tasteless, and insoluble in water and alcohol, but freely so in hydrochloric acid.

Therapeutics.—It is used in the *vomiting of pregnancy* or that due to uterine disorders and displacements, and in some cases of *gastric acidity* instead of bismuth. The dose is from 2 to 5 grains given in pill form every 4 to 5 hours.

CHENOPODIUM.

Chenopodium (*U. S.*) is the fruit of the *Chenopodium Ambrosioides* or American wormseed. The seeds contain a volatile oil and have a distinct and rather disagreeable aromatic odor. These seeds rubbed up into a powdered form with a syrup form an electuary which is most efficient against the *ascaris lumbricoides* or *round-worm* as it occurs in children. The dose of the powdered seeds is from 10 to 30 grains. The better way of using chenopodium is in the form of the oil (*Oleum Chenopodii, U. S.*) in the dose of 10 drops to a child of five years, either on sugar or in an emulsion made of gum acacia. The measures adopted for the treatment of worms should be insisted upon before the drug is given. (See article on Worms.)

CHIMAPHILA.

Chimaphila (*U. S.*), or Pipsissewa, is the leaves of *Chimaphila Umbellata*, an evergreen found in America, Europe, and Asia.

Therapeutics.—Pipsissewa is a drug employed in *atonic renal conditions*, particularly of the functional type, as a stimulating diuretic which will bring into activity the secreting structure of the kidney and the mucous membranes of the genito-urinary tract. It is also a tonic to the stomach. For this reason it is often placed in mixtures given to dropsical patients if debility and anorexia are present. In ulcers of the skin due to struma it is said to be of service, and it probably has some slight alterative power. The drug may be used in the form of a decoction, which is not officinal, in the dose of 1 to 3 fluidounces, and as the fluid extract (*Extractum Chimaphilæ Fluidum, U. S.*) in the dose of ½ to 1 drachm.

CHIRETTA.

Chiretta (*Chirata, U. S.* and *B. P.*), is the plant *Ophelia Chirata*, which is a native of India. It is a bitter tonic, possessing a very distinct influence over the liver, and, unlike many bitter tonics, is devoid of tannic acid. For this reason it may be used with preparations of iron. Chiretta may be given in all cases of *indigestion* and *loss of appetite*, particularly where the *liver is torpid* and if any tendency to *constipation* is present, although it is not directly laxative. When given in powder the dose is 20 grains; the dose of the fluid extract (*Extractum Chirata Fluidum, U. S.*) is 30 drops to 1 drachm, while that of the tincture (*Tinctura Chiratæ, U. S.* and *B. P.*) is 1 to 4 drachms. The unofficinal solid extract may be given in pill in the dose of 2 to 4 grains. The dose of the infusion (*Infusum Chiratæ, B. P.*) is a wineglassful.

CHLORAL.

Chloral (*U. S.*). Although the name chloral is applied to the substance used in medicine, chloral proper is never so employed, hydrate of chloral (*Chloral Hydras, B. P.*) being the real preparation. It is a white, crystalline body, but is often sold in irregular broken masses, which are generally impure.

Physiological Action.—When chloral is applied to a mucous membrane it causes distinct reddening and burning pain, and finally acute inflammation. It is, therefore, a local irritant. Chloral acts as chloral, and is not broken up into formic acid and chloroform, as taught at one time.

NERVOUS SYSTEM.—In medicinal and toxic dose chloral produces sleep by quieting the intellectual centres in the brain, at the same time depressing the motor tract of the spinal cord and the motor nerves. In medicinal amounts it does not decrease sensation, but in toxic dose it does do so. Very often hyperæsthesia results from small doses. Reflex action is decreased by its influence on the motor columns of the spinal cord.

Circulation.—The dose of 10 to 20 grains in the adult rarely causes any circulatory changes, but larger amounts produce a fall of arterial pressure due to a direct depression of the heart muscle, as chloral is a cardiac depressant.

After death from chloral the blood may be found dark and grumous-looking, with the corpuscles broken down, but these changes occur only after very large doses.

Respiration.—In moderate amounts no respiratory effect is felt, but in toxic doses the breathing becomes slower and slower, and more and more shallow, until it stops in death. Death from chloral is due to respiratory failure, with an almost simultaneous stoppage of the heart.

Temperature.—Chloral tends to lower bodily heat, and in large doses produces a very marked fall of temperature, which does much toward causing death. Brunton has found that rabbits will survive very large doses if external heat is applied to them. The fall of temperature is, at least in part, due to the failure of the circulation and vaso-motor dilatation.

Kidneys, Tissue-waste, and Elimination.—Chloral is eliminated by the kidneys in the form of uro-chloralic acid, and if given in excess, as chloral. Large amounts irritate these organs and may produce bloody urine, owing to the nephritis which is set up as the drug passes through the renal structures. When chloral is taken the urine will often give Fehling's test for sugar.

Poisoning.—When a poisonous dose of chloral is taken the person soon falls asleep and sinks into a deep coma. The respirations become at first slow and labored, then shallow and feeble. The pulse, at first perhaps a little slowed, soon becomes rapid, thready, and shuttle-like, and is finally lost at the wrist. The face is white and livid, the forehead and the hands covered with a cold sweat, and the pupils, which are at first contracted, soon become widely dilated. Absolute muscular relaxation is present, and it is impossible to arouse the patient.

Treatment of Poisoning.—The physician should apply external heat, and first use emetics in the early stages, or if the case is seen too late for emetics he should use the stomach-pump. Strychnine should be given in full dose, $\frac{1}{20}$ to $\frac{1}{10}$ of a grain, to stimulate respiration, or atropin may be used for the same purpose. The heart is to be supported by 10 drop doses of tincture of digitalis given hypodermically every twenty minutes until some effect is noted and the rather slow digitalis preceded by ether and ammonia or brandy or whiskey. The patient must not raise the head to vomit, and the head should be placed below the heels to keep the blood in the brain.

In chronic poisoning the patient suffers from weakness, mental and physical, with sudden flushings due to vaso-motor disorder, from palpitation of the heart, and finally from petechial eruptions, ulcerations and sloughs.

Therapeutics.—Chloral is the purest hypnotic that we have, and may therefore be used where simple *nervous insomnia* is present, but not where the *sleeplessness* is due to pain. Under such circumstances it is to be employed in the combination of 10 grains of chloral with $\frac{1}{6}$ of a grain of morphine, as a much more powerful hypnotic effect is produced by the combined action of the two drugs than by the use of either one of them alone.

In *tetanus* and *strychnine poisoning* it is the best remedy we have, as it depresses the motor tract of the spinal cord. In such a case it should be given in 20-grain doses combined with 60 grains of bromide of potassium. If the convulsion prevents deglutition, or is brought on by swallowing, the remedy should be used by the rectum, and if the spasm expels it from the rectum the patient should be chloroformed long enough to allow the injection to be given and absorbed. The same remedies in small doses are to be used in *infantile convulsions* and in *infantile colic* in the dose of $\frac{1}{2}$ grain to 1 grain of chloral to 2 grains of bromide of potassium or sodium in a teaspoonful of peppermint-water. In *chorea, paralysis agitans* and *delirium tremens* chloral is of great service, but must be given cautiously in the latter case for fear it may depress the heart, which is already diseased by alcoholic excess. Cases are on record where chloral has caused sudden death from cardiac failure in the persons of alcoholics who were suffering from fatty heart.

Chloral has been used in labor pains, but is rarely so employed, and is not a good remedy. If much *rigidity of the os uteri* exists chloral may be used with advantage to relax the spasm. The dose given should be 15 grains. In *uræmic convulsions* it has been highly extolled, but if any acute renal trouble is present it must not be used. In *puerperal convulsions* not dependent upon nephritis 30 grains may be given and repeated in one or two hours.

Hiccough, nocturnal epilepsy and *whooping-cough* are all indications for its use, but in asthma it rarely does good, and if pushed is dangerous to the heart.

As an antiseptic chloral possesses a good deal of power, but is rarely used except to prevent the decomposition of urine and to assure the maintenance of purity in urinals used by paralytics, in whom the urine is generally heavy and ill-smelling.

Untoward Effects.—Chloral sometimes causes nausea, purging and vomiting, by reason of its irritant action, and sudden cardiac failure in heart disease has resulted from 20 grains or less.

Administration.—Chloral should be given in syrup of acacia, simple syrup, or water, and should be well diluted. The syrup of chloral (*Syrupus Chloral, B. P.*) is given in the dose of 1 fluidrachm.

Croton Chloral.

Croton chloral, or *Butyl-Chloral Hydras, B. P.*, has a physiological action closely allied to chloral itself, but possesses more anæsthetic power and is very much less depressant to the heart and circulation. The dose for the production of sleep is the same as chloral, 5 to 20 grains in syrup.

Therapeutics.—Croton chloral is infinitely preferable to chloral in sleeplessness due to pain.

In *facial neuralgia* and *migraine* it is exceedingly efficacious, particularly if the fifth nerve be involved. In *headaches* due to *eye-strain*, and in those associated with *sick stomach*, but not due to *gastric indigestion* or *nervous debility*, croton chloral is of service. Curiously it is valueless in toothache, but does good in the *neuralgia due to decayed teeth.*

Administration.—Croton chloral should be used in pill form in the dose of 3 to 5 grains every two hours till the pain is relieved or sleep comes on, or it may be given in solution or syrup of acacia and water, or water and glycerin. It has been used in as large dose as 60 grains, but 20 to 30 grains ought to be the maximum dose.

CHLORALAMIDE.

Chloralamide is a compound very recently introduced, formed by the addition of formamide to anhydrate of chloral, and is a colorless crystalline substance, soluble in 9 parts of water and 1½ parts of alcohol. Its taste is slightly bitter, but not biting, and it keeps well in watery solution without decomposition. Its physiological action is closely allied to that of chloral, except that it is by no means so depressing to the circulation. Upon the nervous system it acts chiefly upon the brain and spinal cord, and produces sleep, a result naturally expected, since both chloral and formamide are hypnotics. It is said not to irritate the stomach and kidneys.

Therapeutics.—Chloralamide may be employed in medicine whenever chloral may be used. It is decidedly a nervous sedative, and in the wakefulness of *nervous insomnia* is very useful. Sleep generally ensues about thirty to forty-five minutes after it is taken. According to most of the reports published so far, the drug relieves pain as well as produces sleep, and is, therefore, distinct in its action from chloral. In *neuralgia* it is very useful, and it has been found of value in the pains of *tabes dorsalis.* The dose is 10 to 30 grains, which may be repeated in three or four hours, although the sleep generally lasts five to eight hours. The following formula may be used in its administration :

℞.—Chloralamide	gr. xl.
Acid. muriat. dil.	gtt. v.
Syrup. simplex	fʒij.
Aq. distillat.	f℥ij.

M.—S. Take in two doses in a little water.

CHLORATE OF POTASSIUM.

Chlorate of potassium (*Potassii Chloras*, *U. S.* and *B. P.*) is a salt of potassium differing entirely in physiological action from all the other potassium salts, and, with the exception of the cyanide of potassium, is certainly the most poisonous. Not only is it, when locally applied, an irritant to mucous membranes, but it is absorbed into the blood and causes changes of a serious character in this fluid, and acute nephritis if given in overdose.

Physiological Action.—It has been thought by some that chlorate of potassium gave up a large amount of oxygen to the body, and for this reason it would be of value in cases of slow asphyxia, as in pneumonia or phthisis. It has even been recommended to persons crossing high mountains where the rarity of the air produced disagreeable effects, but nothing is more absurd than such a belief. Chlorate of potassium does give off oxygen when treated with very high heat, but not at the temperature of the body. Nearly all of it escapes from the body unchanged.

When overdoses of the chlorate are taken it produces sickness of the stomach, headache, pain in the loins and belly, great dyspnœa, cyanosis, heart failure, and great weakness. The blood is dark and chocolate-looking, the change being due to production of methæmoglobin. The blood-corpuscles are crenated and broken down, and the liver, kidneys, spleen, and intestines found softened and filled with broken-down and disorganized blood.

Therapeutics.—Chlorate of potassium is useful in *stomatitis* as a mouth-wash, or, when given internally, in the following mixture:

℞.—Potas. chlorat.	gr. xlviij.
Tr. myrrh.	gr. xxiv.
Elixir calisayæ . . . . q. s.	f℥iij.

M.—S. Teaspoonful every five hours, or as a mouth-wash.

Owing to the fact that the drug is eliminated by the saliva to a great extent, the mucous membranes are constantly bathed by a solution of the chlorate when it is ingested. If any irritation of the stomach or kidneys exist, the medicament must be used on a swab and none of it swallowed. In *diphtheria* it is very commonly employed, but its use is exceedingly dangerous. Death in many cases of diphtheria is due to the renal irritation present, an acute nephritis, and this drug simply increases the disease-process. If the chlorate of potassium is employed in diphtheria it should be used on a swab in solution.

In *anginose sore-throat* chlorate of potassium is a useful gargle, and Wood recommends the use of a solution made by adding 1 ounce of sumach berries, ½ ounce of chlorate of potassium, and 1 pint of boiling water to each other and allowing them to simmer for a few hours, when the mixture should be strained, cooled, and used as a gargle.

The following is equally serviceable:

℞.—Potass. chlorat.		ʒj.
Ext. rhus. glabræ fl.		f℥ss.
Aq. dest.	q. s.	f℥iij.

M.—S. To be added to an equal quantity of water in a glass and used as a gargle every two hours.

This makes an abominable-looking pharmaceutical preparation, but an exceedingly useful one.

In *acute rectal catarrh* with *mucous diarrhœa* and tenesmus, a solution of chlorate of potassium in water, 20 grains to the ounce, injected into the bowel, will often produce a cure after one or two injections. Not more than 4 ounces should be used, and it ought to be retained for twenty minutes. In the treatment of *hæmorrhoids* a few drops of laudanum added to this solution will be found of great service. The troches (*Trochisci Potassii Chloratis*, *U. S.* and *B. P.*) are given in the dose of 1 to 6, each lozenge containing 5 grains.

CHLORIDE OF SODIUM.

Chloride of Sodium (*Sodii Chloridum*, *U. S.* and *B. P.*), or common Salt, is a useful drug and food, aiding in maintaining the alkalinity of the blood and tissues, and in the formation of gastric juice, being changed by the lactic acid of the stomach into lactate of soda, thereby setting free hydrochloric acid, which aids not only in digestion but in the production of pepsin from the pepsinogen of the gastric tubules. The dose is 10 to 20 grains.

CHLORIDE OF ZINC.

Chloride of Zinc (*Zinci Chloridum*, *U. S.* and *B. P.*) is a white, crystalline, deliquescent powder, of caustic taste and acid reaction, possessing considerable disinfectant power. It has been used as an eye-wash in the strength of 1 to 2 grains to the ounce, but is rarely so employed. The same solution may be used as an injection in the second stages of gonorrhœa. Under the name of *Liquor Zinci Chlo-*

ridi, U. S. and *B. P.*, is prepared a strong solution of the salt of the strength of about 50 per cent., for disinfectant purposes.

Numerous experiments with the proprietary "chlorides" show them to be of very slight disinfectant power but strongly antiseptic.

CHLORINATED LIME.

Chlorinated Lime (*Calx Chlorata, U. S., Calx Chlorinata, B. P.*), is the hydrate of lime containing 25 per cent. of chlorine. It is an exceedingly irritant substance, because of the chlorine which is contained in it, and is never used internally.

Much of the chlorinated lime sold is useless and contains too little or no free chlorine. Good chlorinated lime should be so laden with the gas that the face cannot be held near it without the eyes being severely irritated. Unless the chlorine is present it is of no value, as its employment as a disinfectant depends upon the action of this gas, the lime being merely used as a vehicle and oxidizer, as the gas itself would be difficult of application.

Uses.—As a disinfectant chlorinated lime is one of the best, if not the best, we possess for privies, drains, and sinks. A few pounds of it may be added every week to the contents of a privy vault with great advantage, and a solution of it may be used in all bed-pans and urinals. When the passages of a patient having typhoid fever are to be received in a bed-pan, the solution should be placed in the receptacle beforehand, so that the fæcal matter or urine will fall at once into a disinfectant fluid. The solution should be of the strength of 1 pound to 2 gallons. As it is one of the most powerful deodorizers, chlorinated lime should be placed liberally about decaying animals, and, in exhuming corpses, sheets wrung out in a solution made as above will be found of service, if wrapped about the body, to destroy the stench.

Water which has become fœtid by stagnation may be rendered drinkable by adding 1 to 2 ounces of the chlorinated lime to every 65 gallons, and standing the solution aside for some hours till precipitation and exposure to the air have gone on for some time.

It should be remembered that the chlorine fumes will bleach most dyed goods. The placing of chlorinated lime in saucers about sinks and closets is useless, as the amount of chlorine liberated is very slight as compared to the volume of air in the room. Where the chlorine is concentrated enough to kill germs it will also kill the occupant of the chamber. The deodorant effect may be obtained, but a bad smell, if it exists, even when overcome by a greater one, is not really gotten rid of. The officinal preparations of the *B. P.* are, *Liquor Calcis Chlorinatæ* and *Vapor Chlori.*

CHLOROFORM.

Chloroform was originally discovered by Guthrie, of Sackett's Harbor, New York, but first brought into medical use by Simpson, of Edinburgh. It is a clear liquid of an exceedingly hot, burning, sweetish taste, of a rather agreeable odor, and is very volatile in the presence of ordinary air.

There are two kinds of chloroform, the purified (*Chloroformum Purificatum, U. S.*), and commercial chloroform (*Chloroformum Venale, U. S., Chloroformum, B. P.*)

Physiological Action.—Locally applied to the skin chloroform may produce some tingling and burning, even if evaporation be not interfered with. If it is confined under a watch-glass on the skin it will cause a blister and act as a counter-irritant.

When inhaled, chloroform produces a sensation of warmth in the mouth and throat, a feeling of relaxation and, finally, unconsciousness. The respirations are at first full and deep but soon become more rapid and less full. The pulse is also somewhat stronger and fuller for a short interval but then fails in strength and becomes more rapid. The irritation produced in the air-passages by its inhalation is very slight and no primary arrest of respiration ensues, as is generally seen after ether is first given. The pupils are at first slightly dilated but contracted during anæsthesia. *If the pupils dilate during the use of chloroform, after the contraction just named, danger is imminent and death may occur.* In some persons the first effects are to produce violent struggles, and there is danger in trying to overcome these struggles by pushing the drug very rapidly. This is particularly so in athletes and drunkards. Total muscular relaxation should never be caused by the drug.

NERVOUS SYSTEM.—Chloroform first affects the brain, then the sensory part of the spinal cord, then the motor tract of the cord, then the sensory paths of the medulla oblongata, and finally the motor portion of the medulla, thereby producing death from failure of respiration unless the heart has already succumbed to the drug. On the sensory and motor nerves, when locally applied, it acts as an irritant and anæsthetic. Upon these trunks, by inhalation, it has little effect.

CIRCULATION.—Chloroform may, during the first few moments of its inhalation, have a slight stimulant effect on the circulation, but its dominant effect is depressant, and it is in overdose a powerful cardiac poison, absolutely paralyzing the contractility of the heart muscle. It generally kills by heart-paralysis.

BLOOD.—Upon the blood in the body chloroform has little or no effect when it is inhaled. Shaken with chloroform in a bowl outside the body the blood becomes scarlet in hue.

RESPIRATION.—In small amount chloroform may not be a respiratory depressant, but in full dose it certainly acts as such. Death from chloroform may be from either respiratory or cardiac failure, often from both.[1]

TEMPERATURE.—Chloroform by inhalation distinctly lowers the bodily temperature, probably by aiding in the dissipation of heat and by its action on the nervous mechanism of heat production.

ELIMINATION takes place by the lungs and by the kidneys, and goes on very rapidly owing to the great volatility of the drug.

If large amounts are eliminated by the kidneys these organs are apt to become irritated and inflamed.

Antiseptic Power.—Salkowski has investigated, after Koch's methods, the degree to which chloroform-water acts upon microörganisms. He has used chloroform for some years to prevent urine decomposing before he had time to examine it. Chloroform prevents all fermentations which depend upon the growth of microorganisms—*e. g.*, alcoholic fermentation, ammoniacal fermentation of urine, conversion of hippuric acid by fermentation into benzoic acid and glycocol, lactic fermentation, and the putrefaction of albumins, but it has no action on those processes caused by unorganized ferments, as ptyalin, pepsin, etc.

Chloroform-water may be used to prepare solutions for subcutaneous injections and given internally in diseases of the digestive organs depending on the presence of microörganisms—among others, cholera. Possibly the benefit that many patients derive from stomachic mixtures containing chloroform-water as a vehicle is due to its destructive action on various microörganisms. Salkowski gave a dog 200 cubic centimetres (about 6½ ounces) of chloroform-water with its food for four days without producing any ill effect, so that in the treatment of a disease like cholera large quantities of chloroform-water might be given. It may even be employed as a mouth-wash.[2]

Untoward Effects.—Sometimes in the administration of chloroform the heart or respiration suddenly cease, and in some cases this change is preceded by a peculiar shade or cloud which passes over the face of the patient. Death often comes suddenly and without any warning. If untoward effects appear the anæsthetic must be at once withdrawn and artificial respiration resorted to.[3] Injections of ether and hot brandy should be given beneath the skin, and the poles of a battery with a rapidly interrupted current swept over the body, but not held over the phrenic nerve and diaphragm. The patient must be held head downward, to cause the blood to flow to the brain, and external heat be applied. Atropin, strychnine, and digitalis may be used to stimulate the heart and respiration.

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[1] For a lengthy criticism and series of experiments proving an error in the conclusions of the Hyderabad Chloroform Commission see paper by Wood and Hare, Medical News, Feb. 22, 1890.

[2] Chloroform-water is to be made by adding 1 fluidrachm of chloroform to 25 ounces of distilled water. The mixture is then put in a well-stoppered bottle and shaken thoroughly until the chloroform is dissolved in the water. The dose is generally ½ to 2 ounces.

[3] While few text-books give any specific directions concerning the practical application of such methods, those that do so force the physician to a method at once dangerous and impractical, for the directions usually given are to place the positive pole on the phrenic nerve as it crosses the anterior scalene muscle at the root of the neck, the negative pole being pressed against the lower margin of the ribs, a rapidly interrupted cur-

The measures adopted for resuscitation should not be stopped for at least one hour, as persons have recovered as long as this after an accident from chloroform.

Therapeutics.—The first and most important use of chloroform is as an anæsthetic, and at this point we come to a question which has been a matter of contention for many years between different sections of the medical profession, as to whether its use is very dangerous or not. In the southern and western parts of the United States chloroform is nearly always used, but in the eastern and northern portions it is rarely employed. Southerners certainly seem to stand chloroform better than northerners or those living on the Atlantic coast. It is impossible to go into a general discussion of the question here; suffice it to state that even the most enthusiastic supporters of the use of chloroform confess that it is a more dangerous drug than ether, if carelessly used, and while the advantages of chloroform are many, this one great disadvantage overshadows them all. The advantages are its more agreeable odor and lack of irritation to the air-passages, owing to the small amount used to cause anæsthesia, the fact that it is less apt to be followed by nausea and vomiting, the rapidity of its action, and the small bulk which has to be carried by the surgeon. Its disadvantages are the possibility of its suddenly killing the patient by sudden cardiac or respiratory paralysis from which there is no relief, and the powerfully depressing influence which it exercises over the respiratory centres. Owing to these facts the following rules may be laid down in regard to chloroform and ether:

1. Chloroform may be used whenever a large number of persons are to be anæsthetized rapidly so that the surgeon may pass on to others and save a majority of lives, although it endangers a few, as on the battle-field and where only a small bulk of anæsthetic can be carried.

2. Its employment is indicated in cases of Bright's disease suffering from injury requiring the surgeon's attention, owing to the fact

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rent being used with the purpose of causing contraction of the diaphragm by the direct action of the electricity upon the nerve. Even theoretically this is a possible source of danger, and practically we have proved danger to be an ever-present fact under its use. The cardiac inhibitory nerves run so closely to the phrenic fibres, and respond so readily to electrical stimulation, that it is hard to imagine how they can escape stimulation if a current be used of sufficient strength to excite the phrenic nerves near by. By practical experiment we have proved that inhibition of the heart may not only be possibly brought about by this method, but that it is nearly impossible to avoid its production if the phrenics are to be reached at all.

that anæsthesia may be obtained with so little chloroform that the kidneys are not irritated, whereas ether, because of its large quantity, would irritate these organs. Quantity for quantity, ether is, of course, the less irritant of the two.

3. In cases of aneurism, or great atheroma of the bloodvessels, where the shock of an operation without anæsthesia would be a greater danger than the use of an anæsthetic, chloroform is to be employed, since the greater struggles caused by ether and the stimulating effect which it has on the circulation and blood-pressure might cause vascular rupture.

4. In children or adults who already have bronchitis, or who are known to bear ether badly, or, in other words, have an idiosyncrasy to that drug, chloroform may be employed.

5. Persons who struggle violently and who are robust and strong are in greater danger from the use of chloroform than the sickly and weak, probably because the struggles strain the heart and thereby weaken it.

Above all things it is necessary to remember the fact that a person having taken chloroform twenty times before does not show he is not in danger on taking it the twenty-first time, and it is also to be borne in mind that many of the sudden deaths from chloroform have occurred during the first inhalation of the drug before consciousness has been lost, and, therefore, when an accident was least expected.

When chloroform is given it should be poured to the amount of a teaspoonful upon a folded napkin or towel, and the cloth should then be held about three to six inches from the mouth and nose, so that the vapor may be thoroughly mixed with air in the proportion of 95 per cent. of air to 5 of vapor. The administration must be gradual, as "pushing" the anæsthetic is dangerous.

Chloroform inhalations have been recommended in excessive chorea and in puerperal convulsions, and are, of course, of great service in the reduction of hernia, owing to the muscular relaxation produced. Sometimes a few whiffs will put a nervous patient asleep. For some unknown reason parturient women seem able to take chloroform with more safety than men or women in an ordinary condition.

all the family

Chloroform, when taken internally by the mouth, causes a sensation of warmth in the stomach and a hot, burning taste about the lips and buccal mucous membrane. In overdose it can and has produced death when taken in this manner. Although rarely used in internal medicine, chloroform in the form of the spirit of chloroform (*Spiritus Chloroformi*), is useful in cough mixtures, which are given to persons having an irritative cough, and in cases where, through nervousness or other cause, tickling in the throat or bronchial tubes keeps the patient continually in a state of unrest. (See Bronchitis.)

In severe whooping-cough a few drops may be poured on the hand of the attendant and held before the child's face. While the child may at first dislike the odor of the drug the relief given soon teaches him its value, and he will ask for it when he feels the attack coming on.

In *gastric* or *intestinal flatulence* 1 or 2 drops of pure chloroform, or 10 to 20 drops of the spirit of chloroform, will give relief. In *serous diarrhœa* combined with astringents and opium the spirit of chloroform is most useful, provided that the irritating cause is first removed. In *renal* or *hepatic colic* a few inhalations, not sufficient to disturb consciousness, will give not only temporary but permanent relief. Hypodermic injections of 10 to 15 drops, reaching down to a *painful sciatic nerve*, have been recommended by Bartholow. Rubbed on the chest in the form of chloroform liniment it will prevent asthmatic attacks, but it ought to be most carefully inhaled in this state, because of the strained condition of the right side of the heart. In drachm doses chloroform has been used as a remedy for *tapeworm*, but ought never to be so employed.

In liniments of a stimulating character chloroform is very useful over muscles affected by soreness and stiffness, as in *lumbago* and *gout*, and these liniments may also be used in *neuralgias* for their local anæsthetic effect.

Administration.—The officinal preparations of chloroform are a liniment (*Linimentum Chloroformi, U. S.* and *B. P.*), a spirit (*Spiritus Chloroformi, U. S.* and *B. P.*), the dose of which is 20 minims to 1 fluidrachm; and a mixture (*Mistura Chloroformi, U. S.*), composed of chloroform, camphor, yolk of egg, and water, given in the dose of 2 to 4 fluidrachms. The *B. P.* recognizes, besides those given, the following preparations: *Aqua Chloroformi*, given in the dose of ½ to 2 fluidounces; *Tinctura Chloroformi Composita*, composed of rectified spirit, chloroform, and cardamoms, dose 20 to 60 minims; and *Tinctura Chloroformi et Morphinæ*, dose 5 to 10 minims.

Chlorodyne.

Chlorodyne is a preparation used to a very large extent by the English for *serous diarrhœas* or *cramps in the stomach*. Even in England its constitution varies considerably, but the most commonly used formula is as follows:

℞.—Morphinæ hydrochlor.	gr. viij.
Aq. dest.	f℥ss.

Heat together, and as soon as the morphine is dissolved and the liquid cooled, add

Acid. hydrochlor. dil.	fʒss.
Chloroform	fʒjss.
Tr. cannabis indicæ	fʒj.
Acid. hydrocyanic. dil.	♏xij.
Alcohol	f℥ss.
Ol. menth. piperit.	♏xij.
Oleoresin. capsici	♏j.

M.—S. 5 to 15 drops for an adult, in water. More than this quantity is dangerous.

CHROMIC ACID.

Chromic Acid (*Acidum Chromicum, U. S.* and *B. P.*) is not a true acid, but an anhydrate, and occurs in the form of brilliant red crystals which are deliquescent and possess a sour, metallic taste. It should never be mixed with sweet spirits of nitre, strong alcohol, or glycerin, as under those circumstances it may explode.

Therapeutics.—Chromic acid is used solely as a caustic for the removal and destruction of *growths on the skin or mucous membranes.* The solution, resulting from its deliquescence on exposure to the air, may be employed by means of a glass rod, if a very severe action is needed.

Dr. J. Wm. White has recorded a death from the application of this acid to a large number of condylomata about the buttocks and vulva. Where the drug has been swallowed the patient should be treated for the gastro-enteritis, and dilute alkalies and lime-water be used, as well as emetics and demulcent drinks.

If a superficial action is desired, a solution containing 100 grains to the ounce of water is sufficient, and for small warts and similar growths this will be found strong enough.

Liquor Acidi Chromici, B. P., is composed of 1 part acid to 3 of water.

CHRYSAROBIN.

Chrysarobin (*Chrysarobinum, U. S.* and *B. P.*) is a mixture of the proximate principles derived from a powder found in the wood of the tree *Andira Araroba*, which was originally used for medicinal purposes in Brazil. In the East Indies it is called "Goa powder." Chrysarobin is not chrysophanic acid, but is a yellow, tasteless powder, soluble in solutions of alkalies, acids, and ether.

Therapeutics.—Chrysarobin is given internally in the dose of $\frac{1}{8}$ of a grain in *psoriasis* and *parasitic diseases* of the skin, but more commonly is employed externally in the form of the officinal ointment (*Unguentum Chrysarobini, U. S.* and *B. P.*), which is too strong for direct use, and should be mixed with 4 or 5 parts of benzoated lard before application to the skin. As the ointment stains the skin a dark-brown it ought not to be used on the face, although the discoloration may be removed by a weak solution of chlorinated lime.

CIMICIFUGA.

Cimicifuga (*U. S.*) This drug is derived from *Cimifuga Racemosa*, otherwise known as black cohosh or black snake-root. It contains a resin and a volatile oil, upon which its medicinal powers are supposed to depend. It is officinal in the *B. P.* as *Cimicifugæ Rhizoma*.

Physiological Action.—In large doses cimicifuga paralyzes the sensory side of the spinal cord, and in consequence lowers reflex activity. It has no effect on the nerves and muscles. On the circulation the drug acts by depressing the heart and vaso-motor system. Death is due to respiratory arrest.[1] In small dose it is a cardiac stimulant. In overdose it may produce frontal headache.

Therapeutics.—Cimicifuga is, after arsenic, the best remedy we have for *chorea*, particularly if debility is present, when it should be used with careful attention to the bowels and accompanied by iron. In *chronic bronchitis* it is asserted to be of value, and in *rheumatism* of a subacute or chronic type sometimes gives relief.

Cimicifuga has been highly praised in *neuralgia*, particularly of the ovarian type, and in *amenorrhœa, subinvolution, and tenderness of the womb*. In women who state they cannot step off a step without paining or hurting the uterus or ovaries, cimicifuga often gives relief. Some writers assert that it is an efficient and active heart tonic in cases of *fatty* and *irritable heart* where digitalis fails. There can be no doubt that it is a powerful uterine stimulant, and it ought not to be used in pregnancy for fear of abortion. By reason of this power it may be employed instead of ergot, and is better in some cases, because it produces normal, not tonic, contractions. In *headache*, arising from overstraining of the eyes and study, cimicifuga is said to do good.

The drug is officinal in the form of the fluid extract (*Extractum Cimicifugæ Fluidum, U. S.* and *B. P.*), the dose of which is 10 to 30 drops, or even 1 drachm, and the tincture (*Tinctura Cimicifugæ, U. S.* and *B. P.*), the dose of which is 1 to 2 drachms.

CINCHONA.

Cinchona, U. S., is a name applied to the bark of all the trees belonging to the genus Cinchona, provided they contain as much as 2 per cent. of the alkaloid quinine. The same barks are included under the name of *Cinchona Cortex* in the *B. P.* There are thirty-one species of this genus, but only a comparatively small number can be included in the list of 2 per cent. of obtainable alkoloid. These are the Cinchona Calisaya, or *Cinchona Flava, U. S.*, which contains the most quinine, the Cinchona Condominea, Cinchona Micrantha, Cinchona Succiruba, or *Cinchona Rubra, U S.*,

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[1] See Therapeutic Gazette, 1887, p. 731, for research of Dr. R. Hutchinson upon this drug.

Cinchona Rubra Cortex, B. P., and Cinchona Pitayensis. The first is called yellow bark, the second pale bark, the fourth red bark. The alkaloids of the quinine series derived from these barks are quinine or quinina, quinidin or quinidina, and quinicin, which is an artificial alkaloid. Of the cinchonin series we have cinchonin (*Cinchonina, U. S.*), cinchonidin (*Cinchonidinæ Sulphas, U. S.* and *B. P.*), and cinchonicin, which last is also an artificial alkaloid. Besides these alkaloids we have present tannic and kino-tannic acids and other inert and useless substances.

As quinina is the most important of the group, and as its physiological action is virtually identical with the rest, whatever is here said refers to quinine unless otherwise stated.

Physiological Action.—When quinine is taken in overdose it causes ringing in the ears, dizziness, disorders of the taste and smell, disturbance of vision in some cases, and fulness in the head. Deafness often comes on and is generally, with the roaring in the ears, the most pressing symptom. Headache is not uncommonly seen.

NERVOUS SYSTEM.—Upon the cerebrum quinine acts as a stimulant, and, finally, as a congestant, if given in excessive dose. If poisonous doses are used intense cerebral congestion ensues, and, finally, unconsciousness comes on. On the spinal cord the drug first causes a decrease in reflex action by stimulating Setschenow's reflex inhibitory centre, and, finally, by depressing the spinal cord and nerves. The latter changes only occur after poisonous doses.

CIRCULATION.—If quinine, even in small amount, be injected into the jugular vein of a dog, so that it comes in concentrated form to the heart, cardiac paralysis will result. If this does not occur the drug decreases pulse force, rate, and arterial pressure. In minute doses the drug acts as a general stimulant to the entire body and so supports the circulation.

BLOOD.—The blood after poisonous doses is more coagulable than normal, but in medicinal amounts no such effect is produced. The movement of the white blood-cells through the walls of the capillaries in inflamed areas is checked by large doses of quinine, and medicinal amounts increase the number of the red blood-corpuscles very materially. It is said that quinine prevents the oxygen-bearing powers of the corpuscles, but this probably does not occur from medicinal doses.

RESPIRATION.—Upon respiration quinine acts as a slight stimulant in small doses, but as a marked depressant in poisonous amounts, death being most commonly due to this cause if it be taken by the stomach.

TEMPERATURE.—Quinine lowers bodily temperature in health very little if at all, and in fevered states its influence is governed by the cause of the fever. Thus in malarial fevers it is very powerful. In fever *before crisis* quinine is of little service, but in that after crisis it causes a rapid fall.

As an antiseptic quinine has considerable power.

Quinine is absorbed only from the stomach, as it is precipitated by the alkaline juices of the intestine.

KIDNEYS, ELIMINATION, AND TISSUE-WASTE.—Quinine escapes through the body chiefly through the kidneys, although much of it is destroyed by oxidation in the liver and tissues. In the urine it is found as quinine and as dihydroxyl quinine.

Upon tissue-waste quinine acts as a depressant and decreases the elimination of nitrogenous materials.

Poisoning and Untoward Effects.—Poisoning so seldom occurs as the result of the ingestion of overdoses of quinine that untoward effects is the best term to qualify the disagreeable symptoms which sometimes come on in persons having an idiosyncrasy to the drug, and who are in reality poisoned by small doses. In these cases sudden, complete, but temporary blindness often is met with. In other instances complete deafness asserts itself, due to congestion of the middle ear, while skin eruptions, generally of the nature of erythema, are not rarely seen. After lethal doses hæmorrhage into the middle ear may be found, and severe epistaxis may ensue after so small a dose as 4 grains. The buzzing in the ears can generally be put aside by 10 grains of bromide of sodium or a little ergot.

Therapeutics.—This drug is employed in medicine to fulfil three great offices, although its influence in other directions is hardly less powerful. These are as an *anti-periodic* or *anti-malarial*, as a *tonic* possessing peculiar virtues, and as a stimulant to the *parturient uterus*.

In *malarial fever* it is the best remedy we have, as a prophylactic and cure, and should be given in doses which are indicated by the state of the patient. (See Malarial Fever.) It should always be preceded by a purge having an hepatic action, if this is possible. This is particularly so in *bilious* or *remittent* fever. The drug should be given in hourly doses or in one or two large doses in such a way that its influence is fully felt, not at the time of the expected paroxysm, but about an hour or thirty minutes before that time. If the paroxysm is near at hand the drug should be given in solution, bitter though it be, in acidulated water.

As a prophylactic against malaria the dose should be 2 to 4 grains, or more, three times a day.

In *pernicious malarial fever* quinine should be given by the mouth, the rectum and hypodermically, as much as 60 to 70 grains being used at a dose. In *brow ague* or *malarial neuralgia* quinine acts often most usefully, and this is also true in some cases of ordinary nerve-pain not dependent upon a specific disease.

In the fever of *typhus* or *typhoid fever* quinine will be found inferior to the new antipyretics, even when given in very large dose, and rarely ought to be used. It will seldom cause a fall of temperature before *crisis* or *lysis*, but will aid in the fall very actively after these changes have occurred.

As a tonic quinine is not only a simple bitter but also seems to have a direct effect in increasing the number of the red blood-corpuscles. The tonic doses should be 2 grains three times a day.

In parturient women the drug undoubtedly aids in the expulsion of the child by stimulating the uterine contractions, either by a direct influence over the uterus, or by supporting the system. Its use is particularly indicated in cases where the pains have ceased because of exhaustion from prolonged labor. The dose should be 10 to 20 grains dissolved in water in order that immediate absorption may occur. Quinine will not of itself cause abortion.

In the *lobar pneumonia* of children quinine should be used in suppositories in the dose of 2 grains three times a day.

In cases where prolonged mental or physical strain is to be undergone quinine in the dose of 2 to 4 grains will often prevent exhaustion and support the system.

Used in solution in the form of a spray by the atomizer, quinine is of undoubted service in *whooping-cough*, and will often prevent the spread of the disease to other children if they be subjected to its use. The solution should contain from 1 to 2 grains to the ounce and be employed every few hours. It is well to remember that quinine is not tasted by the tip of the tongue, but is tasted by the back portion. The tip of the atomizer should therefore be carried well back of the root of this organ and a 1 per cent. solution of cocaine painted over the dorsum of the tongue in cases where the disagreeable effect of the quinine is objected to very strongly. The same solution of quinine used, by means of an atomizer, in colds in the head and fœtid sore-throat is often of service.

Administration.—Quinine ought never to be given in solution if it can be avoided, because of its disagreeable taste. In adults and children it should be used preferably in small capsules and in pills, which may be gelatin- or sugar-coated. Care should be taken that the gelatin is thin and the sugar not hardened by age, for if the pill escapes into the intestine the quinine is precipitated and not absorbed. If the case is that of a child too young to take a pill, the drug may be given in the following manner without tasting very disagreeably:

℞.—Quininæ bisulph.	gr. xvj.
Ext. glycyrrhiz.	℥j.
Syr. rubi idæi	f℥ij.

M.—S. A teaspoonful t. d. or oftener for a child of three.

In some cases quinine chocolates may be used, but generally even with these the after-taste of quinine is well marked. In other cases quinine may be used in suppository in the dose of 2 to 3 grains, care being taken that irritation of the rectum does not ensue.

For hypodermic use the bisulphate of quinine (*Quininæ Bisulphas*, *U. S.* and *B. P.*) should be most commonly used, as it is soluble in about 8 quarts of water, and to this solution should be added a little tartaric acid to prevent precipitation of the drug in the alkaline juices of the connective tissues before it can be absorbed. The tartaric acid should be present in the proportion of about 1 grain to each 5 grains of the quinine.

The hydrobromate of quinine (*Quininæ Hydrobromas, U. S.*), the solubility of which is about 1 to 16 of water, may be used in this manner, as may also the bimuriate of quinine and urea, which, however, is scarcely more than half as strong in quinine as the other salts. Valerianate of quinine (*Quininæ Valerianas, U. S.*) is given in 1 to 2 grain doses, and the hydrochlorate (*Quininæ Hydrochloras, U. S.* and *B. P.*) in the dose of 1 to 10 grains.

The dose of quinidine sulphate (*Quinidinæ Sulphas, U. S.*) is about twice that of quinine, as is also that of cinchonine sulphate (*Cinchoninæ Sulphas, U. S.* and *B. P.*) and cinchonidine sulphate (*Cinchonidinæ Sulphas, U. S.* and *B. P.*).

The liquid preparations of cinchona are the infusion (*Infusum Cinchonæ, U. S.*), dose a wineglassful; the tincture (*Tinctura Cinchonæ, U. S.* and *B. P.*), one to two teaspoonfuls; and the compound tincture (*Tinctura Cinchonæ Composita, U. S.* and *B. P.*), a teaspoonful to a tablespoonful. The last is a most efficient and elegant bitter tonic in debility and convalescence from low fevers. It is too weak to be used in malarial poisoning. The other liquid preparation is the fluid extract (*Extractum Cinchonæ Fluidum, U. S.*), dose 5 to 15 drops. A solid extract (*Extractum Cinchonæ, U. S.*) is also officinal in the dose of 5 to 10 grains. The *B. P.* preparations not officinal in the *U. S. P.* are as follows: *Decoctum Cinchonæ*, dose 1 to 2 fluidounces; *Extractum Cinchonæ Liquidum*, dose 5 to 10 minims; *Infusum Cinchonæ Acidum*, dose 1 to 2 fluidounces; *Tinctura Quininæ Ammoniata*, dose ½ to 2 fluidrachms; *Vinum Quininæ*, dose ½ to 1 fluidounce.

Contra-indications.—Quinine is contra-indicated in gastritis, cystitis, meningitis, epilepsy, cerebritis, middle ear disease, and in those cases which have an idiosyncrasy to its action.

CINNAMON.

Cinnamon (*Cinnamomum, U. S., Cinnamomum Cortex, B. P.*) is the inner bark of the *Cinnamomum Zeylanicum*, a native of Ceylon, or of the species indigenous to China. It contains a volatile oil and tannic acid. In overdose it acts as a soporific, and kills by failure of respiration.

Therapeutics.—Cinnamon is used, as are all the drugs of its class, for flavoring, as a *carminative*, and as an intestinal stimulant in *serous diarrhœas.* It has the peculiar power of acting as a hæmostatic in *uterine hæmorrhage* where the flow is oozing and not active, thereby differing from the other volatile oils, with the exception of that of erigeron.

Administration.—The dose of the oil (*Oleum Cinnamomi, U. S.* and *B. P.*) is 1 to 5 drops; of the water (*Aqua Cinnamomi, U. S.* and *B. P.*) a wineglassful or less; of the spirit (*Spiritus Cinnamomi, U. S.* and *B. P.*) 5 to 30 drops; of the tincture (*Tinctura Cinnamomi, U. S.* and *B. P.*) ½ to 1 drachm. Under the name of *Pulvis Aromaticus, U. S.* (*Pulvis Cinnamomi Compositus, B. P.*), a carminative powder, consisting of cinnamon 35 parts, nutmegs 15 parts, cardamoms 15 parts, and ginger 35 parts, is officinal. It is useful in the flatulence of adults and children. The latter should take about 10 grains, an adult 30 grains.

CITRATE OF POTASSIUM.

Citrate of Potassium (*Potassii Citras, U. S.* and *B. P.*) is a white, granular, deliquescent salt, almost neutral in reaction and very soluble in water. It is by far the most agreeable of all the salts of potassium to the taste. In the early stages of bronchitis it is of the greatest value combined with ipecac (see Bronchitis), and it is also useful as an alkaline diuretic. In *bronchitis* the dose should be 20 grains every four hours, and also in *urinary incontinence* from concentrated urine the dose should be equally large.

Under the name of neutral mixture (*Mistura Potassii Citratis, U. S.*), made by adding to 1 pint of lemon juice enough bicarbonate of potassium to neutralize it, we have a useful febrifuge drink in *fevers*, particularly those of childhood. The dose is ½ to 1 ounce every few hours.

Liquor potassii citratis, U. S., is made in the same way, except that citric acid is substituted for the lemon juice (citric acid 720 grains, potassium bicarbonate 960 grains, and water 24 ounces).

Neutral mixture is the better of the two, but more expensive. A very refreshing and agreeable way of prescribing this drug is in the form of "effervescing draught," made by mixing two solutions which are prepared as follows: 1. Lemon juice and water, equal parts, enough to make 4 ounces. 2. Bicarbonate of potassium 1 drachm, and water 3 ounces. These solutions are to be mixed in the quantities desired and taken while effervescing. If lemon juice is not at hand, a solution of citric acid of the strength of 2 drachms to 4 ounces of water should be employed.

CITRIC ACID.

Citric Acid (*Acidum Citricum*, *U. S.* and *B. P.*) is chemically identical with the acid of the lemon, but has not identical influences over the body with lemon-juice.

Not only does the lemon owe its acidity to this acid, but most of the other edible fruits, such as strawberries and raspberries, depend upon its presence for their acidity.

Therapeutics.—Citric acid is used in *scurvy* or *scorbutus* as a prophylactic and cure. For some unknown reason pure lemon-juice seems to benefit these cases more than citric acid itself, and it is, therefore, to be preferred to the latter whenever it can be had. In order to keep lemon-juice from decomposition on long voyages, it should be boiled and poured while hot into bottles until it nearly reaches to the cork; the remaining space is then filled with a thin layer of sweet oil and the bottle corked and stood upright, when the juice may be kept indefinitely.

In some cases lemon-juice or lemonade will cause indigestion and a sensation of weight in the stomach, particularly in the sick. This is due to the presence of soluble irritant albuminoids, which should be precipitated by boiling the lemonade, decanting the solution on cooling, and leaving the precipitate to be thrown away. If the supernatant liquid is cooled and properly sweetened it is equally agreeable with the fresh juice and devoid of irritant power.

In *rheumatism*, either *acute* or *chronic*, citric acid or lemon juice may be employed in the dose of 1 to 2 ounces four times a day, well diluted. It is also of value in *hepatic inactivity and catarrhal jaundice*. (See Citrate of Potassium.)

The preparations containing citric acid are *Syrupus Acidi Citrici*, *U. S.*, *Succus Limonis*, *B. P.*, and *Syrupus Limonis*, *B. P.*

CLOVES.

Cloves (*Caryophyllus*, *U. S.*, *Caryophyllum*, *B. P.*) are the unexpanded flowers of the *Eugenia Caryophyllata*, a plant of the East and West Indies. They possess an aromatic odor and the pungent taste of a typical spice. They contain a volatile oil (*Oleum Caryophylli*, *U. S.* and *B. P.*), which is yellow when fresh but very dark colored when old.

Therapeutics.—Cloves, or their oil, are used in medicine for the purpose of acting as a *carminative*. They are also employed in ordinary *flatulence* as a stimulant and tonic to the stomach, to prevent griping in *diarrhœa* and that caused by purgatives, to act as a flavoring agent, as a counter-irritant, and, finally, as a *parasiticide* and local *anæsthetic*.

Like all volatile oils, this oil is an efficient local application for *pediculus pubis* and similar parasites, and may be used in *toothache* on a pledget of cotton placed in the cavity in a tooth, because of its anæsthetic powers. In *myalgia* or *muscular rheumatism* it is often placed in the liniment used, for its counter-irritant effect. In overdose it acts as a soporific and kills by failure of respiration and marked gastro-enteritis. Minute doses of ½ to 1 drop of the oil in a little water will sometimes control excessive vomiting. In addition to the oil the *B. P.* has an officinal infusion, *Infusum Caryophylli*, the dose of which is 1 to 2 fluidounces.

COCA AND COCAINE.

Cocaine is the alkaloid derived from *Erythroxylon Coca*, a shrub of Peru and Bolivia. A second alkaloid, known as Ecgonine, has entirely different powers. It is to be distinctly understood that Erythroxylon Coca is not the same as chocolate or Theobroma Cacao. This drug is officinal in the *B. P.* as Coca and in the *U. S. P.* as Erythroxylon.

Physiological Action.—Coca, when taken internally, produces symptoms identical with those of the alkaloid, namely, a sense of exhilaration and pleasure. Often the amount of muscular and mental power is temporarily increased. When locally applied to a mucous membrane cocaine causes a blanching followed by marked congestion.

NERVOUS SYSTEM.—The dominant action of cocaine, when locally applied, is to paralyze the peripheral sensory nerves. When taken internally it stimulates the brain to an extraordinary degree. If the dose be a poisonous one, convulsions of cerebral origin ensue, and are clonic in type.

Upon the spinal cord cocaine exerts comparatively little effect, stimulating it in small amounts and depressing it in very large doses. The sensory nerves are also paralyzed by enormous doses, either when it is directly applied or taken internally.

CIRCULATION.—Cocaine acts as a stimulant to the heart and circulation in moderate amounts, but its effects are not marked except in poisonous dose.

RESPIRATION.—The drug acts as a powerful respiratory stimulant, producing in large dose a great increase in the rapidity of the respiratory movements.

TEMPERATURE.—Cocaine raises bodily temperature to a very extraordinary degree if given in overdose, this rise being due to an increase of heat-production. (Reichert.)

KIDNEYS, ELIMINATION, AND TISSUE-WASTE.—The drug is eliminated by the kidneys, but is chiefly destroyed by oxidation in the body. The quantity of urine passed is increased and the nitrogenous elements a little diminished.

EYE.—Owing to its powerful action as a local anæsthetic, cocaine has been used largely in diseases of the eye. The anæsthesia after the use of the drug comes on in from one to five minutes, according to the strength of the solution used, and is accompanied by very marked dilatation of the pupil. It is important to remember that this dilatation, unlike that produced by mydriatics such as atropine, does not paralyze accommodation. The dilatation of the pupil is due to a peripheral stimulation of the sympathetic nerve. The drug does not cause a forcible mydriasis, and is never used for the prevention of adhesions in iritis.

Therapeutics.—Cocaine hydrochlorate (*Cocainæ Hydrochloras, B. P.*) is used as an anæsthetic in the eye in the dose of from 3 to 5 or more drops of from a 1 to a 4 per cent. solution. The strength of 2 and 3 per cent. is perhaps most commonly employed.

The conditions indicating its use are all operations upon the eye of a painful character, be they what they may, and also for the relief of pain where an *acute inflammation* or foreign body is causing suffering. The following will be found useful in these states:

℞.—Cocain. hydrochlor.	gr. viij.
Acid. boracic.	gr. vij.
Aq. dest.	f℥j.

M.—S. Use with a dropper in the eye every hour till relieved.

Cases are recorded in which cocaine has caused permanent corneal opacities.

Where *enucleation of the eyeball* is to be practised the drug should be replaced by general anæsthetics, but cocaine may be used if it is injected deeply around the orbit.

Owing to the density of the mucous membranes of the vagina and rectum, cocaine has little effect upon them unless used in 10 per cent. solution and profusely applied. In the mouth cocaine may be used in cases of *stomatitis* where a spot is to be cauterized, in *pharyngitis* and in *soreness and tenderness of the gums.* While it gives much temporary relief in *pharyngitis* the subsequent effects are often exceedingly disagreeable, the congestion looking more angry and being more painful than before. In *coryza and hay fever* a powder consisting of cocaine, morphine, and bismuth in the proportion of one part each of the two alkaloids and five parts of the bismuth will often be of service if snuffed up into the nostrils. If cocaine be applied to a large nerve-tract amputation of the tributary limb may be performed without pain, but so much must be used that there is great danger of poisoning the patient.

Cocaine is generally used at present in cases requiring *amputation* *of the fingers* in place of ether. A tight cord should be bound around the base of the finger and a 4 per cent. to 8 per cent. solution injected into the part, a ligature about the base of the digit being used to prevent hemorrhage and the systemic absorption of the drug.

Internally cocaine, or the fluid extract of coca, may be used as a supportive and stimulant in low fevers and cases where great physical and mental strain is to be borne.

It is undoubtedly of service in the opium habit, but if largely used changes the patient from a case of morphiomania to a "coca fiend." In the *vomiting of pregnancy* and other forms of *excessive emesis* it is of great service by depressing the sensory nerves and thereby decreasing the irritability of the stomach. The dose of the fluid extract (*Exiractum Erythroxyli Fluidum, U. S.*) is from ½ to 2 drachms. That of cocaine from ¼ to 1 grain. The *B. P.* preparations are *Extractum Cocæ Liquidum*, dose, ½ to 2 fluidrachms, and *Lamellæ Cocainæ*, each disc containing $\frac{1}{100}$ grain of cocaine hydrochlorate.

Untoward Effects.—Sometimes loss of speech, blindness, nausea and vomiting, syncope and unconsciousness have followed the internal use or local application of the drug. Epileptiform convulsions have also been noted, while the circulation and respiration have been disordered in every possible manner. Curiously enough a large number of cases of severe poisoning have followed the injection of cocaine into the urethra in cases of gonorrhœa and stricture.

COD-LIVER OIL.

Oleum Morrhuæ, U. S. and *B. P.*, is a fixed oil obtained from the fresh livers of the *Gadus Morrhuæ* or cod fish. There are several species of cod from which the oil is obtained other than the one named, but this is the chief source of supply. The oil is pale or dark, according to its degree of freedom from foreign materials. Although the paler oils are generally prescribed, there can be little doubt that the darker ones are more medicinally active. The most prominent inorganic constituents of the oil are iodine, bromine, sulphuric and phosphoric acids. It also contains more or less of the biliary salts.

Physiological Action.—Cod-liver oil depends on a number of substances for its peculiar effect. The iodine certainly exerts certain alterative powers and the oil seems readily adapted to digestion and absorption. Cod-liver oil passes through animal membranes very readily, probably owing to the biliary salts contained in it.

It aids in the maintenance of bodily temperature by its oxidation and causes the deposition of fat in the tissues. The oil also seems to influence the blood directly, for clinical observation shows that anæmic persons become healthy looking under its use, and Cutler and

Bradford have found that this is true by the use of Malassez's blood-cell counting apparatus, the red corpuscles being always increased. It has been proved by experiment that this oil is more readily oxidized than any other.

The belief among physicians that the effects of cod-liver oil are dependent upon some peculiar combination of substances has shown itself in the attempts of physiological chemists to isolate the combination. One of the best results reached is that of Chapoteau, who seems to have isolated a crystalline substance containing phosphorus, iodine, and bromine. Three to five grains of this represent one drachm of the pure oil, and it is certainly of value as a medicament in most of the states in which we use the oil itself. In "colds" which "hang on" and are not readily gotten rid of, morrhuol is best given in capsule or pill. One firm supplies this substance gelatin coated.

Therapeutics.—Cod-liver oil is useful in persons who have no *tubercular lesion* in the lungs or other tissues, but have mucous membranes which are readily susceptible to disease. This state has been called the *pretubercular stage of phthisis*. In *chronic rheumatism* the drug is often of great service, particularly if the disease is largely muscular. *Strumous skin lesions* depending for their existence not only upon *scrofulosis* but also upon *anæmia* often yield to its use. In *enlargement of the lymphatic glands*, where they are not undergoing acute active suppuration, cod-liver oil does good. This is a statement requiring explanation. By acute active suppuration is meant the early formation of pus or the molecular death of the parts—not the slow formation characterized by no active change but represented by cold-abscess, or old sores. If the discharge is chronic the oil does good. In *strumous ophthalmia* it is of great service. In advanced *syphilis* cod-liver oil is most useful, and in the early stages of *rickets* it is very valuable. In *marasmus*, when used by inunction, it is one of the best drugs we have. If a few grains of bile-salts, consisting of glycocholate and taurocholate of sodium be added to each drachm of oil it will be very readily absorbed from the skin.[1]

In *sciatica* and *lumbago* and in *neuralgia* cod-liver oil is of service. In *emphysema of the lungs* it is said to be of great value, and certain writers commend its use in *gout*, although some others have asserted that it is of no value. Sometimes old persons whose digestion is not disordered and who have no organic brain disease, complain of *giddi-*

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[1] These salts may be bought, or made as follows: To about 300 cc. of ox-gall is added nearly thrice that quantity of ordinary alcohol, and the flask shaken thoroughly. All the mucus is now precipitated and the supernatant fluid is filtered. To the filtrate is added a large excess of sulphuric ether and after a time a plaster-like mass forms at the bottom of the vessel, which slowly becomes crystalline. These crystals are now placed on a filter paper and washed with a mixture made up of ether and alcohol, equal parts. The filter paper is dried and the substances then seen are the taurocholate and glycocholate of sodium. Having carefully removed these salts from the paper they are ready for use.

ness. The best remedy for this condition is cod-liver oil and doses of quinine.

Administration.—Owing to its disagreeable taste and smell most patients rebel against using cod-liver oil, but this can, with a little persistence, be readily overcome, so that finally the patient may not only not object to its use but actually like it. This is particularly so with young children. The secret of reaching this much-to-be-desired state lies in the use at first of doses which may be dropped in a teaspoon and the spoon then gently submerged in a glass of milk. The oil then floats off in a globule in the centre of the milk in the tumbler, and if the milk be rapidly gulped down without the oil touching the sides of the glass it will not be tasted. The first gulps must be large enough to include the oil. The dose should always be taken on a full stomach, and if it be followed by a little pancreatin in five or ten minutes its digestibility will be much increased. Other modes of ingestion consist in the placing of the oil in whiskey or brandy, in the manner which has been described with milk, and this method possesses the advantage that the alcohol aids very distinctly in the absorption of the oil. Sometimes a pinch of salt placed in the mouth before and after the oil is taken aids in covering its taste and in its digestion. (See Indigestion.) Oil of eucalyptus in the proportion of 1 to 100 of the cod-liver oil will cover the latter's taste, but many dislike the eucalyptus more than the cod-liver oil. The addition of equal parts of glycerin and half to one drop of the oil of bitter almonds to each dose is often of service. Syrup of bitter orange-peel is one of the best covers to its taste. Tomato ketchup has also been used with good results. Chewing a piece of smoked herring before and after taking the oil is of value in some cases to disguise its taste.

Cod-liver oil is most readily digested when given in single nightly doses after supper, or after a light meal just before going to bed. After a few days it may be given after dinner, and in the course of a week after breakfast. If the patient is once nauseated by overdoses it is almost impossible to make the stomach retain it. If it cannot be digested a drachm of ether aids in its absorption, or a drink of whisky or brandy may be used instead.

A large number of preparations of cod-liver oil are on the market in emulsion, pancreatized and purified till they are tasteless. Many of the permanent or perfect emulsions have more Iceland moss or acacia than oil. The pancreatized emulsions are the best if the oil is really present in sufficient quantity to do good, and the mere fact of its being artificially digested adds to its value and the possibility of putting more oil into the emulsion. Oil devoid of smell is probably devoid of medicinal value, as all the peculiar properties have been "purified" out of it. Cod-liver oil may be used in capsules with great success.

CODEINE.

Codeina, U. S. and *B. P.*, is an alkaloid prepared from opium, and is often contaminated by morphine. Its physiological action is very closely allied to that of its sister alkaloid—morphine—but it is very much less powerful.

Therapeutics.—Codeine has been highly recommended in France as a nervous quietant, and in this country in *nervous cough* or in cases where the cough is excessive in *bronchitis* and *phthisis*. Under these circumstances it should be used in the dose of from ½ to 2 grains, generally placed in the syrup of wild-cherry bark.

COLCHICUM.

Colchicum is the corm (*Colchici Cormus, B. P.; Colchici Radix, U. S.*) and seed (*Colchici Semen, U. S.; Colchici Semina, B. P.*) of the *Colchicum Autumnale*, a plant of Europe, containing an alkaloid, colchicin, which may be still further changed into colchicein. While the drug is officinal in the form of the seeds and root the former are rarely employed.

Physiological Action.—Colchicum when locally applied is an irritant to the gastro-intestinal mucous membrane, and is a very powerful drug.

According to the studies of one of the writer's students—Dr. Ferrer Y. Leon—the drug has little or no effect in moderate dose on the nervous system, circulation, respiration or temperature, only producing changes in these parts when given in poisonous doses.

Therapeutics.—The employment of colchicum in medicine centres around its use in *gout* and similar states, such as *chronic rheumatism* or *rheumatoid arthritis*. Indeed, it is almost a specific in *acute gout*, provided that it be pushed till it causes slight griping or laxity of the bowels. Care must be exercised under these circumstances that "retrocedent gout" does not occur, owing to the manifestations of the disease leaving the toe and going to the internal viscera. In some cases iodide of potassium should be used in conjunction with the colchicum, particularly is this the case in subacute or chronic cases.

The use of colchicum in such doses as to cause severe purgation or emesis is dangerous, and ought not to be resorted to.

Poisoning.—The symptoms in poisoning are nausea, griping, agony in the belly, purging followed by the passing of thick mucus with great and increasing tenesmus, profuse salivation, collapse, and death from exhaustion and gastro-enteritis. Bloody purging is almost never seen. The poisoning is one of the most painful, slow, and hopeless poisonings known, and a man taking as much as an ounce of the wine of the root or the seed is almost inevitably doomed to a terrible death. Tannic acid may be used as a partial chemical antidote, and the stomach washed out with emetics and the stomach-pump. Opium is to be used to relieve the pain and irritation, and oils are to be given to soothe the inflamed mucous membrane. If collapse comes on external heat and stimulants are to be used, and atropine may prove of service in this stage.

Administration.—Colchicum ought never to be used in substance, but should be employed in the form of wine of the root (*Vinum Colchici Radicis, U. S.*) in the dose of 10 to 20 drops, although if a marked effect is required 30 drops may be used. The extract (*Extractum Colchici Radicis, U. S.*) is given in the dose of 2 to 5 drops, and the fluid extract (*Extractum Colchici Radicis Fluidum, U. S.*) in the dose of 2 to 4 minims.

Of the seeds, the tincture (*Tinctura Colchici Seminis, U. S.* and *B. P.*) is given in 30 to 90 minim doses; the wine (*Vinum Colchici Seminis, U. S.*) in the same amounts, and the fluid extract (*Extractum Colchici Seminis Fluidum, U. S.*) in the dose of 2 to 5 drops. The *B. P.* preparations besides those given are *Vinum Colchici*, dose 10 to 30 minims; *Extractum Colchici*, dose ½ to 2 grains; and *Extractum Colchici Aceticum*, dose ½ to 2 grains.

COLLODION.

Collodium, U. S. and *B. P.*, is a solution of gun-cotton in alcohol and ether, and is a clear, syrup-like fluid, smelling strongly of ether.

Therapeutics.—Collodion is used as an air-tight dressing for *small wounds* and *abrasions*, and for rendering small dressings waterproof. A difficulty in its use consists in the contraction which takes place as it dries, drawing and puckering the part sufficiently to cause not only discomfort but acute pain. It should be applied with a camel's hair brush over the part affected.

In *boils* where they are beginning in a small pustule or papule with an inflamed zone, collodion painted over the spot will generally abort the disease. If the boil has burst this treatment is useless, but if it has not the pus should not be liberated, but allowed to become inspissated. Thus, by frequent application of a coat or two, the trouble eventually disappears. Of course, this rule only applies to certain cases, and if pain is caused by the retention of the pus it must be evacuated with antiseptic precautions. In smallpox the flexible collodion is to be used to prevent pitting.

In *gouty inflammations* of the joints an application of collodion mixed with iodine, equal parts, will often remove the pain, although at first it may be increased.

Flexible Collodion.

Flexible Collodion (*Collodium Flexile, U. S.* and *B. P.*) is made by adding turpentine 5 parts and castor oil 3 parts to ordinary collodion. It does not contract or become hard, and is generally to be preferred to ordinary collodion in the dressing of wounds.

Styptic Collodion.

Styptic Collodion (*Collodium Stypticum, U. S.*) contains tannic acid, and is employed to control *small hæmorrhages.* It is seldom used, and is a dirty way of controlling bleeding.

Cantharidal Collodion.

Cantharidal Collodion (*Collodium cum Cantharide, U. S.*) has been referred to under the head of Cantharides. *Collodium Vesicans, B. P.*, is identical with the last preparation, and is used for the same purpose.

COLOCYNTH.

Colocynthis, U. S., is the fruit of the *Citrullus Colocynthis*, a plant at present largely grown in all parts of the world. It contains an alkaloid colocynthin, a minor alkaloid, and a resin. None of these are ever used in medicine. Colocynth causes large watery evacuations, and may in very large dose produce fatal gastro-enteritis. It is officinal in the *B. P.* as *Colocynthidis Pulpa.*

Therapeutics.—Colocynth is never used alone, but always in combination with other drugs of its class as a *hydragogue cathartic.*

In cases of *chronic dropsy* or in *serous effusions* it is generally given in the form of the compound extract of colocynth (*Extractum Colocynthidis Compositum, U. S.* and *B. P.*), which contains 16 parts of colocynth, 50 parts of purified aloes, 14 parts of the resin of scammony, 6 parts of cardamom, and 4 parts of soap. In the dose of 5 to 20 grains this acts as a powerful watery purge. The extract (*Extractum Colocynthidis, U. S.*) is given with other drugs in the dose of 2 to 5 grains as a purge. Colocynth is one of the principal ingredients in compound cathartic pills (*Pilulæ Catharticæ Compositæ, U. S.*). Each pill contains: compound extract of colocynth, 1⅓ grains; abstract of jalap and calomel, each 1 grain; gamboge, ¼ grain.

The preparations of the *B. P.* not officinal in the *U. S. P.* are: *Pilula Colocynthidis Composita*, composed of colocynth pulp, aloe scammony, sulphate of potassium, and oil of cloves, dose 5 to 1 grains, and *Pilula Colocynthidis et Hyoscyami*, dose 5 to 10 grains.

CONIUM.

Conium, *U. S.* The leaves and fruit of the *Conium Maculatu* are both officinal. The plant grows in Europe and the United State and contains a resin known as coniin. This drug is officinal in th *B. P.* as hemlock leaves (*Conii Folia*) and hemlock fruit (*Con Fructus*).

Physiological Action.—When conium is taken in very full dose i causes weakness and a sense of relaxation, giddiness, staggering, an disordered vision, with failure of the circulation.

NERVOUS SYSTEM.—Conium causes paralysis of the motor nerves, and, if the dose be extraordinarily large, depression of the sensory nerves. Upon the spinal cord it exerts a feeble, depressing influence, but has no positive effect, while the fact that mental power remains almost up to death shows that the cerebrum escapes its influence.

CIRCULATION.—The action of the drug upon the circulation is depressant. It causes at first a fall of arterial pressure, then a rise, due to the asphyxia caused by nervo-muscular failure of the respiratory apparatus. Finally a constant fall of pressure takes place.

RESPIRATION is depressed because of its influence on the nerve-trunks supplying the muscles.

Therapeutics.—Conium holds an unimportant place in the drug-list of to-day.

It has little value except in spasms due to *irritation of a nerve-trunk*, when it may be of service. In *spasms* of cortical or spinal origin other drugs should be used. The powdered leaves or other preparations may be smeared over poultices to relieve the pain of *ulcers and cancers*, and it certainly does good in some such instances.

Administration.—The dose of the abstract (*Abstractum Conii, U. S.*) is from ½ to 3 grains, that of the alcoholic extract (*Extractum Conii Alcoholicum, U. S.*) is from 1 to 1½ grains, and of fluid extract (*Extractum Conii Fluidum, U. S.*) 2 to 6 drops. The dose of the tincture (*Tinctura Conii, U. S.* and *B. P.*) is 10 to 30 drops. Coniine is a volatile liquid which should never be used. The dose is about $\frac{1}{60}$ of a grain. The preparations in the *B. P.* made from the leaves are: *Cataplasma Conii*, for external use; *Extractum Conii*, dose 2 to 6 grains or more; *Succus Conii*, dose 30 minims to 2 fluidrachms or more; *Vapor Conii*, for inhalations; *Pilula Conii Composita*, composed of extract of hemlock and ipecac, dose 5 to 10 grains.

It is to be remembered that the variability of the drug, so far as power is concerned, is very great, so great as to make it unreliable.

Poisoning.—A prominent symptom of the poisoning is ptosis of the eyelids, due to paralysis of the oculo-motor nerves, and the staggering and inability to walk already named. Its treatment consists in the use of strychnine as a respiratory and nervous stimulant, the employment of external heat, and the use of cardiac stimulants if the circulation fails. The stomach is to be emptied by emetics or the stomach-pump before the antidotes are used.

COPAIBA.

Copaiba, *U. S.* and *B. P.* Copaiba of the *U. S. P.* is really the balsam of copaiba or the oleo-resin of copaiba, and is a clear, transparent liquid of oily consistency, of a pale yellow color and a peculiar odor.

Therapeutics.—Copaiba is used for the purpose of stimulating the mucous membranes of the genito-urinary tract, particularly when they are depressed after a period of inflammation, as in the later stages of *gonorrhœa.* Similarly it is employed in *subacute and chronic bronchitis* as an expectorant. In *pyelitis*, *cystitis*, and in *dysentery* it is of value. In *dropsy* due to slow renal changes it will often be of service.

Administration.—The oil of copaiba (*Oleum Copaibæ*, *U. S.* and *B. P.*) is given in capsule or emulsion, preferably in the former, in the dose of 10 to 20 minims two to four times a day. Sometimes it is dropped on sugar. *Massa Copaiba*, *U. S.*, is made by rubbing up the oleoresin with magnesium, but this is a useless and clumsy way of using it in the pill form.

The drug is eliminated in the urine and gives the test for albumin with nitric acid.

In some cases it causes urticaria, which soon ceases on the withdrawal of the drug.

COPPER.

Cuprum is never used in the form of the metal itself, but as the sulphate, which appears in commerce as a blue, clear, somewhat efflorescent salt. It is soluble in four parts of cold water, two of boiling water, but not soluble in alcohol.

Physiological Action.—Copper sulphate, when locally applied to a mucous membrane, acts as a powerful astringent, or, on the surface of an ulcer, as a mild and superficial caustic. Upon the nervous system in cats it acts as a depressant poison when given hypodermically, finally causing death from respiratory failure. When given in overdose by the stomach it causes death by violent gastro-enteritis and exhaustion. The symptoms do not generally come on for an hour, but consist in burning pain in the stomach, a copperish or metallic taste in the mouth, followed by vomiting of bluish liquids and glairy mucus. With the vomiting purging comes on, the passages at first containing the contents of the intestine, and finally mucus and blood. Convulsions of an epileptiform character are present and constant and profuse salivation is not uncommon. After death fatty degeneration of the liver and kidneys has been noticed, and it is not at all uncommon for jaundice to appear after the first twenty-four hours if the patient survives so long. This jaundice is dependent upon changes in the blood. The treatment of the poisoning consists in the primary use of the chemical antidote, which is the *yellow prussiate of potassium*, and the employment of emollient or demulcent substances such as sweet oil and white of eggs, followed instantly by emetics or the stomach-pump. If emesis and purgation are already present, emetics are of course contra-indicated, and counter-irritation is to be employed over the stomach and intestines in the shape of a mustard plaster of moderate strength, with opium to allay irritation and relieve pain.

Chronic copper poisoning is almost never seen, and although the metal is largely used for coloring canned green vegetables, it seems to be harmless in such small amounts.

Therapeutics.—Sulphate of copper (*Cupri Sulphas, U.S.*, and *B.P.*) in the dose of 5 to 7 grains may be used as a rapidly acting *emetic* which only acts upon the stomach, not the vomiting centre. As it is irritant the emetic dose ought not to be repeated, but if emesis does not occur the sulphate of zinc or mustard should be used in its stead. Indeed, it may be said of sulphate of copper that it should never be given as an emetic, except as the chemical antidote in phosphorus poisoning. In pill form it is sometimes given in *diarrhœas* depending upon ulceration of the bowels. The dose should be $\frac{1}{4}$ to 1 grain combined with opium.

In some states of the body, particularly in *skin diseases of the dry type* and in persons with *tubercular tendencies*, copper seems to act like arsenic and may be used in minute doses of $\frac{1}{10}$ of a grain or less three times a day where arsenic is not well borne. It is said to be in small doses a direct stimulant to the tissues and to increase the firmness of the flesh and strength of the normal man.

Injected into the rectum in the strength of 5 to 20 grains to the ounce the drug will be found of service in those cases of *diarrhœa* affecting the lower bowel and dependent upon ulceration.

Locally applied sulphate of copper is of service, in the solid form or in powder, in indolent ulcers. In *chronic conjunctivitis* or in cases of *tinea tarsi*—that is, tinea on the margin of the eyelids—the crystal may be drawn over the diseased spot, or a weak solution of 1 to 3 grains to the ounce of water dropped into the eye in subacute conjunctivitis.

In *relaxed sore throat*, as a gargle, in the strength of 4 grains to the ounce, it is often of service. Nitrate of copper (*Cupri Nitras, U. S.* and *B. P.*) and acetate of copper (*Cupri Acetas, U. S.*) serve the same purpose as the sulphate.

CREOLIN.

Creolin is a black fluid derived from soft coal and of the consistency of syrup. When added to water it forms a white cloud and mixes thoroughly, forming an emulsion up to 12 per cent. of the drug.

Therapeutics.—Creolin is used as an antiseptic in the lying-in state, as a *wash for the hands* and for *vaginal irrigation*. It cannot be used as a solution in which to place instruments as it makes so opaque a mixture with water as to prevent their being seen. When used as a vaginal douche it should be employed in the strength of 2 per cent. One property which is of value is, that it forms a slippery coating over the maternal parts during parturition. In *cystitis* in the female Parvin highly recommends it as a vesical wash in the strength of a 1 per cent. solution, or, after the bladder becomes accustomed to its use, 2 per cent. solution. According to Kretzschmar and others, a solution of 1 to 500 is useful in *otorrhœa* if used with a syringe, and 1 to 100 in *nasal ulcers*, and 1 to 1000 as a nasal douche in *rhinitis*, with much discharge and the formation of crusts.

In the eye, Alt has used a 1 to 2 per cent. solution in *blepharitis, keratitis,* and *phlyctenular ophthalmia*.

CREASOTE.

Creasote (*Creasotum, U. S.* and *B. P.*), as employed in medicine, should always be derived from the destructive distillation of beechwood and be called "beechwood creasote." Much of that sold is derived from coal-tar and is far less useful. Chemically creasote is almost identical with carbolic acid. It is a powerful antiseptic. Beechwood creasote should be of a reddish amber hue and about as thick as olive oil. Its physiological action is almost identical with that of carbolic acid, and in poisoning by creasote the same antidotes, soluble sulphates, should be used[1] (Hare).

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[1] See University Medical Magazine, 1889.

Therapeutics.—During the past year or two creasote has been largely recommended in *phthisis* and *chronic bronchitis,* and some of the results reached by its use have undoubtedly been of value. It has also been inhaled from sponges with great relief, and has been even injected into the lungs by the trachea or through the chest-wall. (See article on Tuberculosis.) In bronchitis creasote may be placed in boiling water and inhaled in the steam. Under these circumstances it at least relieves the fetor of the breath, and often gives more rapid relief than any other means in ordinary inflammation of the bronchi. The dose is 2 to 5 drops. Applied on a pledget of cotton to the cavity of a tooth it often relieves *toothache.*

When given in *phthisis* the following prescription may be used or the drug may be placed upon a Yeo's inhaler and inhaled in that way:

℞.—Creasote (beechwood) . . . . . . fʒiij.
Tinct. gentian. comp. . . . . . . f℥j.
Spts. vini rectificati . . . . . . fʒviij.
Vini xerici . . . . . . q. s. ad Oij.
M.—S. A tablespoonful in a wineglassful of water three times a day.

Creasote is useless so far as a cure is concerned if tuberculosis is more than incipient, and ought not to be employed if it disorders the stomach. The inhalations often give relief in the advanced stages of phthisis and decrease the cough, allay the laryngeal dryness, and aid expectoration.

The preparations of creasote are *Aqua Creasoti, U. S.*, given in the dose of 1 to 3 fluidrachms; *Mistura Creasoti, B. P.*, dose 1 to 2 fluidounces; *Unguentum Creasoti, B. P.*, for local application, and *Vapor Creasoti, B. P.* used by inhalation.

CROTON OIL.

Croton oil (*Oleum Tiglii, U. S., Oleum Crotonis, B. P.*) is an exceedingly irritant oil derived from *Croton Tiglium*, a small tree of India. The oil is pale yellow and of a complex character. Applied to the skin it is an intense irritant, producing blisters or pustules. One drop placed on the tongue acts as a violent watery purge, and, owing to the smallness of its dose, it is frequently employed to *revulse* the *unconscious,* as in *cerebral congestion.* In delirium it is used for the same purpose, and may be given to maniacs. The dose is 1 drop placed on the tongue or given in emulsion or in pill. It ought never to be used when there is any irritation of the stomach or bowels. As a counter-irritant it is sometimes applied over a tender nerve, or in *bronchitis* to the chest, half and half with sweet oil. Thus applied it may be absorbed and cause purging. The treatment of poisoning by croton oil is that of gastro-enteritis. *Linimentum Crotonis* is a preparation of the *B. P.*, which is employed as a counter-irritant liniment on sprains and in muscular rheumatism.

CUBEBS.

Cubebs (*Cubeba, U. S.* and *B. P.*) are the unripe fruit of *Cubeba Officinalis*, a plant of Java. They consist in wrinkled or rough black bodies, about the size of small peas, and have an aromatic, pungent taste. They contain a volatile oil, cubebic acid, and cubebin. The drug should not be kept in powdered form as it loses its powers, but be powdered as needed. Overdoses cause gastro-intestinal and genito-urinary inflammation.

Therapeutics.—Cubebs are used in the advanced stages of *gonorrhœa* where the tendency to a chronic discharge is present. Some surgeons have used them in the early stages as an abortive treatment, but this is a bad practice. In cold in the head the powdered berries may be snuffed up the nostril, provided that the stage of secretion is well established. They ought not to be used before this stage.

Administration.—Cubebs may be given in powder in the dose of 10 to 60 grains, in the fluid extract (*Extractum Cubebæ Fluidum, U. S.*) 10 to 30 drops, and in the form of the tincture (*Tinctura Cubebæ, U. S.* and *B. P.*) in the dose of 10 drops to ½ an ounce.

The dose of the oleo-resin (*Oleoresina Cubebæ, U. S.* and *B. P.*) is 2 to 20 drops. The latter may be given in capsules or emulsion. The troches of cubebs (*Trochisci Cubebæ, U. S.*) are used for pharyngitis of a chronic type. The dose of the oil (*Oleum Cubebæ, U. S.* and *B. P.*) is 5 to 20 minims.

CYANIDE OF POTASSIUM.

Cyanide of potassium (*Potassii Cyanidum, U. S.* and *B. P.*) is used in the same way and for the same purpose as hydrocyanic acid. (See Hydrocyanic Acid.) The dose is $\frac{1}{10}$ to $\frac{1}{12}$ of a grain.

The following prescription may be used in *bronchitis* or *phthisis* associated with excessive cough :

℞.—Potas. cyanid.	gr ij.
Morph. sulph.	gr. j.
Acid. sulph. arom.	f ʒ ij.
Syr. pruni virg.	q. s. f ℥ iij.

M. S —Teaspoonful three times a day, or as follows :

℞.—Potas. cyanid.	gr. ij.
Ammon. muriat.	ʒ ij
Acid. muriat. dil.	f ʒ j.
Elix. calisayæ.	q. s. f ℥ iij.

M. S.—Teaspoonful, three times a day.

DIGITALIS.

Digitalis, U. S., is obtained from the leaves of *Digitalis Purpurea*, or foxglove of the second year's growth. The leaves are officinal in the *B. P.* as *Digitalis Folia.* It contains a number of alkaloids none of which represent its true active principles, which probably reside not in one, but in several forms. Digitalin is more nearly the active principle than any of the other alkaloids and occurs in two forms, the crystalline and amorphous. Both of these often fail. The other alkaloids or principles are digitonin, digitalein, and digitoxin.

Physiological Action.—Digitalis is apt to irritate mucous membranes which are already slightly out of order, and for this reason should not be given by the mouth in cases of gastritis and similar states.

NERVOUS SYSTEM.—The action of digitalis over the nervous system is only manifested when poisonous doses are used. Small toxic doses decrease reflex action by stimulating Setschenow's reflex inhibitory centres in the medulla, and finally by depressing the spinal cord. Convulsions are sometimes seen as a result of the disorder of the circulation at the base of the brain, owing to the disturbed and abortive action of the heart. Finally, the motor nerve-trunks themselves are depressed.

CIRCULATION.—Upon the circulatory system digitalis exerts its chief influence. In moderate amounts it increases the pulse force and arterial pressure, slows the pulse, and increases the size of the pulse wave. The increase in pulse force is due to a stimulating influence exercised upon the cardiac ganglia and the muscular fibres of the heart, the rise of arterial pressure is caused by this increased pulse force and pulse volume, and by a stimulation of the vaso-motor centre and the muscular coats of the bloodvessels, whereby a contraction occurs in the walls of the arteries and arterioles. The slow pulse is produced by stimulation of the pneumogastric centre and the peripheral ends of the vagus nerves. The increase in the volume of the pulse is due to this influence on the vagi, for the pneumogastric nerves being stimulated the diastole of the heart is more full and complete and occupies a greater length of time. The result of this delay is that the ventricles become thoroughly distended, and on contracting drive out a much larger wave of blood through the aorta than is normally sent out. This is important to remember when using the drug in heart-disease and other states. While we do not know that the vagi are the trophic nerves of the heart, we have a large amount of evidence in favor of such a view, and it has long been thought that digitalis was not only a heart stimulant, but a heart tonic. If the trophic nerves of the heart are stimulated by digitalis it at once becomes evident that it is a doubly useful remedy.

The action of digitalis upon the heart is a double one, in that it creates two opposing forces. By the action on the heart muscle it steadily strives to cause contraction or systole of the ventricles; by the action on the vagi it equally steadily struggles to produce diastole or dilatation of these cavities. In medicinal dose neither of these tendencies gets the upper hand, for both are equally excited, so that now increased systole occurs, now increased diastole.

In poisoning, on the other hand, or in instances where overdoses have been given, so much stimulation is caused that the heart beats now slow, now fast, now strong, now weak. Slow when the vagi overcome systole, fast when systole overcomes the vagi, strong when systole escapes from the inhibitory nerves, weak when the ventricles can scarcely contract because the vagi are holding the ventricles open.

If the patient be raised up he may drop dead, owing to the still more active disturbance of the balance of power caused by the calls for blood due to the erect position, and under these circumstances the heart beats so fast that it has not time to get enough blood into it to pump anything out, or so feebly that the dilated ventricles are never emptied. Finally, a fall of arterial pressure ensues, not because the vaso-motor system is depressed, but because the heart cannot pump out enough blood to fill the bloodvessels.

RESPIRATION.—Digitalis has almost no effect on this function.

TEMPERATURE.—Upon the normal bodily temperature digitalis has little or no effect in medicinal dose. In poisonous dose it lowers temperature. In fever the drug seems to cause a fall of a small amount with some constancy, but it can rarely be used for any antipyretic influence.

KIDNEYS, TISSUE-WASTE, AND ELIMINATION.—Digitalis has almost no effect over the kidney structure itself, and does not to any extent stimulate the renal epithelium. The cause of the increased urinary flow produced in cardiac dropsy depends upon the removal of congestion of the kidneys and the increased arterial pressure brought about by the drug.

Upon tissue-waste digitalis seems to have little effect, and there is still some discrepancy in the reports as to the amount of urea cast off under its use, some investigators saying it is increased, others that it is diminished.

We do not know how the drug is eliminated, as chemists have never been able to find it in the urine. It is probably oxidized in the body.

Poisoning.—The slow, full pulse, followed by the hobbling, dicrotic, shuttle-like pulse-beats, and the angry, tumultuous cardiac beat against the chest-wall, affords a combination of symptoms characteristic of over-action of digitalis. The pulse may be full and slow when lying down, but at once becomes irregular on the patient's sitting up.

Often when the patient has by error received too much of the drug the finger can scarcely note any pulse at the wrist, while the ear placed over the heart shows it to be beating wildly, as though it would break out of the chest It is important that the weak pulse at the wrist be not taken as the only guide as to the state of the patient for this very reason.

As the poisoning progresses vomiting may come on, exophthalmos occurs, and a peculiar blue pearliness of the sclerotic coat of the eye is seen. Consciousness is generally preserved nearly to the last. Death may be put off for days, or occur in two hours, or even less. Headache is often a severe symptom.

TREATMENT OF POISONING.—Tannic acid is to be given as a chemical antidote; emetics and the stomach-pump are to be used; external heat is to be applied, particularly about the abdomen; the maintenance of a horizontal position must be insisted upon, and the use of tincture of aconite, as the physiological antidote, resorted to.

Therapeutics.—Much unfortunate misunderstanding concerning the action of digitalis has arisen, and while some call it a circulatory stimulant, others think it a circulatory depressant. The first class base their belief on the signs of arterial pressure and cardiac power, the others on the fact that it slows and steadies an irritable, rapidly-acting heart, while they overlook the other signs. *Digitalis is a cardiac stimulant, and not a depressant.* The quieting of irritability by it is the quietness produced by the drink of whiskey or coffee taken by the speaker before mounting the platform or the pugilist before he enters the ring to steady his nerves and make him firm. If it is used to decrease arterial tension its dose must be dangerously large. (See Physiological Action.)

Digitalis is of value in all cases of cardiac disease where the condition is one in which the heart fails to do its proper amount of work. If simple hypertrophy or excessive compensatory hypertrophy exists it is harmful. It is of less value in aortic regurgitation than in any other lesion, because the prolongation of diastole allows greater opportunity for the blood to fall back into the ventricle. In some instances the drug does harm by over-distending the auricle through ventricular stimulation, and we can never tell before trying it which cases will be so affected. In cases where the heart is *irritable*, *palpitation* is present, and indigestion is not the cause of the trouble, digitalis is of service. (See Heart Disease.)

In the *second stage of pneumonia* it is invaluable (see Pneumonia), and in *exhausting fevers*, in small doses, is of great service. In *congestion of the lungs* in the typhoid state, it will drive out the blood from the part congested and relieve stasis.

In *cardiac weakness* from *collapse*, *injury*, *poisoning* or *shock* digitalis is of service, particularly in *aconite poisoning*, where it is the physiological antidote. Owing to the slowness of its action it should, however, be preceded by ammonia and alcohol where the need is pressing. In muscarine poisoning it is the antidote.

As a *diuretic* digitalis may be used where the *kidneys are congested* and the circulation is sluggish. Where the renal structure is diseased, other drugs should take its place, or it should be combined with more active renal remedies, such as squill or caffein, or in very chronic cases with compound spirit of juniper.

In some cases a *cumulative action* occurs which consists in the failure of the drug to influence appreciably the circulation for some days, only to exert all its power suddenly and produce symptoms of poisoning. This is particularly the case where the removal of ascites or dropsy takes place by tapping after the drug has been taken for a long period. It is thought that the sudden withdrawal of pressure causes the absorption of the drug from the juices of the tissues which has remained in them heretofore unused.

The contra-indications to the use of digitalis are atheroma of the bloodvessels of a marked type, aneurism, apoplexy, and any state of arterial excitement.

Administration.—The officinal preparations of digitalis are the tincture (*Tinctura Digitalis, U. S.* and *B. P.*), dose 10 to 20 drops; the infusion (*Infusum Digitalis, U. S.* and *B. P.*), 1 teaspoonful to 4 teaspoonfuls; the fluid extract (*Extractum Digitalis Fluidum, U. S.*), dose 1 to 2 drops; the abstract (*Abstractum Digitalis, U. S.*), $\frac{1}{2}$ to 1 grain; the extract (*Extractum Digitalis, U. S.*), $\frac{1}{4}$ of a grain; and the powdered digitalis leaves (*Digitalis Folia, B. P.*), dose 1 to 4 grains, generally given in pill. The tincture is the preparation most commonly used, and is most satisfactory, although the infusion has been thought of greater value without any reason.

The dose of digitalin, which ought not to be used, is $\frac{1}{50}$ of a grain.

ELATERIUM.

Elaterium, B. P., is a sediment obtained from the juice of the *Ecbalium Elaterium*, or squirting cucumber. It appears in small, easily broken, thin, grayish-green flakes, and has a bitter taste. Elaterium is not officinal in the *U. S. P.*, but its active principle, elaterin (*Elaterinum, U. S.* and *B. P.*), is. Notwithstanding this fact, the crude preparation is largely used.

Physiological Action.—Elaterium is a very decided irritant to all mucous membranes, and even to the hands of those who handle it. Its chief effect in man is to cause profuse watery stools, but for some unknown reason it rarely acts upon animals in this manner.

Therapeutics.—This drug is the best hydragogue purge which we have, causing very large watery passages, but not producing much pain when used in proper dose. For this reason it is useful in *local serous effusion*, as in *pericarditis* and *pleurisy* and in *dropsy* and *ascites*. It ought never to be used in cases of marked exhaustion, and may be advantageously followed soon after it acts by alcoholic stimulants. In *uræmia*, with dropsy, it is thought to aid in the elimination of the poison by the bowel. In *cerebral congestions* or effusions the drug will often be of service.

In poisoning by elaterium the symptoms are those of violent gastro-enteritis and must be treated accordingly.

Administration.—The dose of elaterium is $\frac{1}{8}$ of a grain, given in a freshly made pill. Elaterin is best given in the dose of from $\frac{1}{16}$ to $\frac{1}{32}$ of a grain, as follows:

℞.—Elaterinæ	gr. iv.
Alcohol	f℥iv.

M.—Dissolve by gentle heat. S. Half a drachm contains $\frac{1}{16}$ grain or one full dose.

The officinal preparations of elaterin, the active principle of elaterium, are *Trituratio Elaterini, U. S.* (elaterin 1, sugar of milk 9), given in the dose of $\frac{1}{2}$ to $\frac{3}{4}$ grain, and *Pulvis Elaterini Compositus, B. P.* (elaterin 1, sugar of milk 39), dose 1 to 5 grains.

ERGOT.

Ergot (*U. S.* and *B. P.*) is derived from the spawn or mycelium of the fungus known as *Claviceps Purpura*, which grows in the flower and replaces the grain in common rye or *Secale Cereale*.

Many so-called active principles have been isolated by chemists and named *ecbolic acid, ergotic acid, sclerotinic acid,* and *ergotin.* None of them represent the entire drug, the nearest in its approach being ergotin, and under these circumstances ergotin is not an isolated principle, but a combination of principles.

Physiological Action.—

NERVOUS SYSTEM.—Upon the nervous system ergot exercises little, if any, effect. In chronic poisoning, due to eating rye-bread contaminated by ergot, we sometimes see what is known as spasmodic ergotism due to disturbances of the circulation in the nervous system.

CIRCULATION.—Ergot when injected into the circulation causes a primary fall of arterial pressure, followed by a rise. The dominant action is represented in the rise. This rise is due to a stimulation of the vaso-motor centres, but the primary fall to a direct depressant effect upon the heart muscle, resulting from contact on the part of the drug *en masse* with the heart.

If the dose be very large the fall of pressure is never recovered from, and progressive paralysis of the vaso-motor apparatus and heart occurs.

UTERUS AND UNSTRIPED MUSCULAR FIBRE.—Ergot acts as a stimulant to the uterine muscle, and causes contraction of unstriped muscular fibres everywhere.

On the uterus it shows its influence, not by increasing the normal pains of labor, but by causing a tetanic, tonic, unyielding uterine spasm which drives all before it.

This is only seen in parturient, and not in gravid, uteri. We do not know whether the action of ergot is upon the uterine nervous centres or upon the womb itself, but it is probably the latter.

Therapeutics.—Ergot to be used in labor for the cure and prevention of *post-partum hæmorrhages.* For the prevention it should be given to the woman by the mouth just as the head is about to slip over or has slipped over the perineum, and not before. If ergot be given before this the constant contraction of the uterus prevents the circulation in the cord and placenta, and produces sloughs in the maternal soft parts because of the pressure of the fœtal head. The fluid extract or wine should be used in the dose of 1 drachm or 4 drachms, respectively. In post-partum hæmorrhages the same dose or larger ones may be used, and the solution of the aqueous extract of ergot should be given hypodermically. The extract should be rubbed with the proper amount of water (parts 1 to 5), and filtered through a fine aseptic handkerchief to get rid of foreign bodies before it is injected.

In *hæmorrhages from the lungs and kidneys,* or other unapproachable parts, ergot is very useful when given by the mouth.

In *epistaxis, menorrhagia,* and *metrorrhagia,* and in some cases of *night-sweats,* it is of service. In *hypostatic, pulmonary, and other congestions* it is of service, particularly if used with digitalis.

In *dysenteries* with true bloody stools and *serous diarrhœa* ergot sometimes does good.

Ergot has been used very largely in *uterine fibroids* as an expulsive remedy and cure. It is only of value in those cases where the growths are just beneath the mucous membrane. By the contraction of the uterine fibres the blood-supply of the growth is decreased, the recurring hæmorrhages cease, and the tumor is finally expelled, having really sloughed out of its bed. This method is inferior to the knife, and very painful and prolonged. Large growths cannot be so treated. Ergot is sometimes useful in *bleeding hemorrhoids,* and it has been given with success in *diabetes insipidus.* In some cases of chronic poisoning gangrenous ergotism comes on, due to local anæmias of the toes or other extremities, or it may be replaced by spasmodic ergotism.

Administration.—Ergot is officinal in the *U. S. P.* as the fluid extract (*Extractum Ergotæ Fluidum*), dose 1 drachm; the solid extract (*Extractum Ergotæ*), dose 10 to 20 grains; and the wine (*Vinum Ergotæ*), dose 2 to 4 drachms. Bonjean's ergotin is made by a special process, but it or the solid extract can be given hypodermically, as already described. The *B. P.* preparations are *Extractum Ergotæ Liquidum,* dose 10 to 30 minims; *Infusum Ergotæ,* 1 to 2 fluidounces; *Tinctura Ergotæ,* 10 minims to 1 fluidrachm. Ergotin

(*Ergotinum, B. P.*) is given in the dose of 2 to 5 grains. *Injectio Ergotini Hypodermica, B. P.* (ergotin 1, camphor water 2 parts) is given in the dose of 3 to 10 minims by subcutaneous injection.

ERIGERON, OR FLEABANE.

Oil of Erigeron (*Oleum Erigerontis, U. S.*) is a yellowish, volatile oil of a peculiar, not bad, taste, closely resembling turpentine. It is by far the best remedy which we have for passive *uterine oozing*, or a "show," as it is sometimes called.

In *epistaxis* and other hæmorrhages of a subacute type it is quite useful. In some instances it may supplant copaiba and cubebs in the later stages of *gonorrhœa.* It is best given in capsule or on sugar, in the dose of 10 to 30 drops after meals, or oftener if needed.

ETHER.

Sulphuric Ether is officinal as *Æther, U. S.* and *B. P.*, and *Æther Fortior, U. S.* Ordinary ether is not generally used as an anæsthetic, but for the abstraction of oils and other pharmaceutical purposes. It is made by the action of sulphuric acid on ethylic alcohol, and is sometimes called in consequence ethyl oxide. Ordinary ether contains about 74 per cent. of ethyl oxide and 16 per cent. of alcohol, with a little water. On the other hand, the stronger ether contains about 94 per cent. of ethyl oxide and only 6 per cent. of alcohol, with water. Both preparations boil when held in a test-tube, if a piece of broken glass is added to the liquid. The stronger ether boils much more vigorously, however, than the weaker.

Ether possesses a peculiar penetrating odor, a hot burning taste, and is a colorless, volatile, and very inflammable liquid. For this reason it should never be held near a fire or light, and, as its vapor is heavier than air, any light in the room should be above the patient, not below him. No light should be held nearer than five feet.

Physiological Action.—The action of ether on the animal organism is very rapid, powerful, and temporary. Except for the rapidity of its effects it is very much like that of alcohol. When applied to the skin it causes intense cold by its evaporation, and may be used to benumb or locally freeze a part.

Upon mucous membranes it acts as an irritant and causes, when first inhaled, great irritation of the fauces and respiratory tract so that temporary arrest of respiration is not uncommon. The face becomes suffused and red and the conjunctiva injected, but a stage of physical quiet succeeds the primary stage of struggling which arises from the choking sensations. During this period the breathing is generally full and deep and the pulse rapid but strong, while the ocular reflexes are at its beginning intact. Following this stage a second period of struggling comes on, in which the patient may become absolutely uncontrollable except by brute force. Yelling, shouting, screaming, cursing or laughing and crying may be prominent symptoms, and the individual is pugilistic, caressing or ill tempered, as the case may be. If the drug is now pushed a condition of total anæsthesia is attained, and quietude takes the place of the struggles. This is the time for the operation to be carried on, for if it is attempted in the early stages the pain is not put aside, while the struggles of the second stage preclude any operative procedure. It is not proper to push the muscular relaxation to complete flaccidity, as this endangers the respiration.

NERVOUS SYSTEM.—Ether act first on the brain, then on the sensory centres of the spinal cord, then on the motor centres, then on the sensory centres of the medulla oblongata, and, finally, upon the motor centres of the medulla with death from respiratory failure. Upon the nerve-trunks it exerts no effect unless it is directly applied to them. Ether does not act by influencing the blood, coagulating the protagon of the nervous system, or by any other destructive influence. It simply puts aside, for the time being, the vital functions of the parts affected by it.

CIRCULATION.—Ether is one of the most diffusible and rapid cardiac stimulants which we possess, and is correspondingly fleeting in its effects. It increases the pulse-rate and force by stimulating the heart and by increasing the activity of the vaso-motor centres. In overdoses it acts as a cardiac depressant, but only when the amount is very large.

RESPIRATION.—When ether is first inhaled it often causes an arrest of respiration. According to Kratschmar, this is due to an irritation of the trifacial nerve which causes a reflex spasm of the glottis, and is not due to irritation of the peripheral vagi in the lungs. This is only partly true, for it has been proved[1] that section of the vagus nerve prevents its occurrence so that both the vagal and trigeminal irritation are responsible for the arrest.

Upon the respiratory centre ether acts as a powerful stimulant in ordinary amounts, in overdose it paralyzes this part of the system.

TEMPERATURE.—A prolonged etherization lowers the bodily heat very greatly. That of the dog may be lowered some 9° F. in an hour if the drug be pushed, and as great a fall has been known as 4° F. in man (Hare). The fall is partly due to the depression of the nervous system and the chilling of the body and lungs by the evaporation of the drug.

ELIMINATION.—Ether escapes from the body by the lungs and kidneys.

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[1] Hare: University Medical Magazine, 1889.

Untoward Effects.—Ether, while safer than chloroform, is not absolutely devoid of all danger. Sometimes when the drug is pushed too strongly deep cyanosis with pulsation of the jugular veins shows deficient oxidation and cardiac distention. In other and very rare instances sudden cardiac failure has occurred, or total arrest of respiration ensued. In nearly all cases of sudden death from ether grave kidney or other lesions have been present, and has been shown at the autopsy.

One of the earliest signs of the over-action of ether is the failure of diaphragmatic movement, followed by that of the lower part of the chest, then of the upper part and then of the cervical muscles.

In patients under ether the movement of the diaphragm is an exceedingly interesting study, for before the condition known as surgical anæsthesia is developed, while there is still some rigidity, and the throat reflex is not completely abolished, the contractions of the diaphragm are frequently so violent that unless the laryngeal opening be absolutely free, the intercostal spaces are depressed and the abdominal contents thrust violently downward and outward. Just so soon, however, as the chin is pulled forward and a free access of air is allowed, the abdominal displacement is not so great, though it still remains present, and the chest movement is no longer reversed. As the ether is pushed, the respiration becomes purely thoracic, the diaphragm no longer taking part in the respiratory cycle, or becoming so relaxed that it allows the chest on expansion to aspirate the abdominal viscera upward, as is shown by the retraction of the belly walls at a time when they should normally expand with the thorax in inspiration. This observation would seem to point to the fact that the primary stimulant action of ether upon the respiratory apparatus is particularly felt by those centres which govern the movements of the diaphragm, and that, as this is the case, these centres later on are the first to feel the paralyzing effect of still larger amounts of the drug.

This gives us, therefore, yet another danger signal during the administration of the ether, and we hold that the integrity of the diaphragmatic function, as represented by the movement of the belly walls, should be as carefully observed as are the thoracic excursions, the character of the pulse, or the condition of the pupil. The rule may therefore be laid down that when the diaphragm ceases to act, anæsthesia has been carried to its extreme legitimate limit, and that the use of an anæsthetic after this time must be carried on with the greatest care and watchfulness.

The diaphragm is the first part of the respiratory mechanism to yield to respiratory paralysis. In death from any cause, the progress of failure of respiration will, in the vast majority of cases, be denoted by a failure on the part of the diaphragm primarily, with compensatory excursions of the chest; and it is also to be noted that as the chest movements fail, the accessory muscles of the neck come into *play.* These muscles in time cease to act, the hyoidean group lose their *point d'appui*, the chest remains motionless, the lower jaw is dropped, and the scene is closed by a few gasps in which the muscles of the neck may be the chief factors.

The treatment of accidents consists in the withdrawal of the ether, the use of artificial respiration, the placing of the body, if the face is pale, head downwards and the hypodermic injection of strychnine, atropine, and digitalis, or the intravenous injection of ammonia, which is better still. Ether is often given hypodermically under such circumstances and seems to do good, but is a bad practice, as, if the heart or respiration is depressed already by ether, the use of still more of the drug simply makes matters worse. Where it does good the hypodermic injection of ether probably causes so much local pain and irritation as reflexly to call up respiratory movements.[1] For the same reason alcohol ought not to be used if the other drugs named can be obtained, because alcohol is so nearly allied physiologically and chemically to ether. Frictions, hot applications, and artificial respiration should be practised (see article on Asphyxia).

As ether is at hand it may be dashed on the chest and abdomen to cause reflex inspiration in lieu of cold water, which wets the clothes and does not evaporate. (Hare.)

In some cases great nausea and vomiting follows the use of ether. This can generally be done away with by the proper use of food before the operation (see Therapeutics of Ether), and by the use of cracked ice and small doses of aconite. (See Vomiting.) Severe bronchitis may occur in invalids and children after the inhalation of ether.

Therapeutics.—Ether is used chiefly as an anæsthetic by means of inhalation. The method consists in forming a cone out of a towel and a piece of paper and placing a small sponge in its end. Upon this sponge the ether is placed and the large open mouth of the cone is placed over the face. If this be done the sensation of suffocation is generally so great as to cause fright and struggling, which is inadvisable. The better way is to hold the cone at some distance from the face and gradually bring it nearer as the effects of the ether are felt. After partial anæsthesia is attained the cone should be placed closely over the face and the vapor be pushed in as concentrated a form as possible, whereas in using chloroform it should be well mixed with a great amount of air. Care should be taken that the ether does not get into the eyes of the patient, either in vapor or liquid form, owing to the irritation which it will set up. To prevent this a thin piece of muslin wet with water will be found of service if placed over the eyes.

When ether is to be given no food ought to be allowed the patient except a little milk or tea an hour or two before the operation in order to avoid vomiting during and after the procedure. The patient should have no tobacco or false teeth in the mouth, as they may slip into the larynx and cause death.

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[1] As consciousness is not necessary to the carrying out of a reflex action, this is perfectly possible and probable.

Locally ether may be used in an atomizer spray as a local anæsthetic owing to the cold produced. This is particularly useful in cases where *thoracentesis* or *paracentesis abdominis* is to be performed, and also in cases of superficial *neuralgia*, where the benumbing of the nerve often effects a permanent cure.

Internally, by the stomach, ether is very useful in *colic*, although for *flatulence* of adults and children Hoffmann's Anodyne is generally used as a more agreeable remedy. In cases of *collapse* its hypodermic and gastric use make it of great service when cardiac action is very feeble, and it will give relief by inhalation in some of these cases more rapidly than the nitrite of amyl.

In *hiccough* a few inhalations will often put aside the disorder, and local muscular spasms can be relieved in this way, thereby aiding in the reduction of herniæ.

In cases where cod-liver oil cannot be digested ether may be given in 20-drop doses in ice water or capsule, either with, or some minutes after the oil is taken, to aid its digestion and absorption. The time of its use should be that at which discomfort is apt to come on and not at any stated moment. The spirit of ether (*Spiritus Ætheris*, *U. S.* and *B. P.*) is a useful carminative in the dose of 30 to 90 minims.

Pure ether (*Æther Purus*, *B. P.*) is free from alcohol and water.

Administration.—Ether should be used in ice-cold water or, better still, in capsules, in the dose of 30 drops to ½ ounce. If cold water is not used, so great are the fumes of the ether that deglutition is impossible.

Contra-indications.—Ether should not be used by inhalation in bronchitis, acute nephritis, peritonitis or gastritis, or in aneurism and great vascular atheroma.

ETHYL BROMIDE.

Ethyl Bromide is a liquid employed as an anæsthetic, but possessing so powerful an influence over the heart as to make its employment in prolonged operations exceedingly dangerous. It acts with even greater rapidity than chloroform, producing anæsthesia after the first, second, or third whiff, and rarely causes a preliminary stage of excitement. Those who have used it assert that the operation may be begun in from five to twenty seconds after the first inhalation and that the inhalations may then be stopped at once, provided the operation is a short one, such as opening a boil or abscess.

It is to be remembered, however, that alcoholics are particularly susceptible to its lethal influence and that the employment of the drug throws a large amount of responsibility upon the surgeon.

EUCALYPTUS.

Eucalyptus, U. S., is the leaves of the *Eucalyptus Globulus* or Blue Gum Tree, a native of Australia, but grown at present all over the world.

Their chief medical constituent is the oil of Eucalyptus (*Oleum Eucalypti, U. S.*), from which is derived Eucalyptol.

Physiological Action.—Locally applied the oil is a decided irritant. Ten to twenty drops taken internally cause slight stimulation followed by a sense of calm, while larger doses produce disturbed digestion and loose, oily-odored stools. The pulse is increased in frequency and force and intense headache may come on. After very large doses there is a fall in pulse force, bodily temperature, and strength of limb and the respirations are decreased. A peculiar loss of sensation in the lower limbs may occur. If death occurs it is due to respiratory failure. The drug is eliminated by the skin, kidneys, bowels and lungs. The urine may have the odor of violets, as it sometimes does from the use of oil of turpentine.

The oil of eucalyptus has considerable antiseptic power.

Therapeutics.—Eucalyptus is used in *malarial fever* where quinine cannot be had or be borne by the patient owing to idiosyncrasy. In *bronchitis* in an emulsion or in capsule it is of great value in the later stages (see Bronchitis), and it may be used in the subacute forms of *gonorrhœa* in the same manner, since in its elimination by the lungs it acts locally upon the inflamed mucous membrane.

Oil of eucalyptus is very useful in some forms of rheumatic *headache* or in headache dependent upon a history of malarial fever.

Administration.—The extract (*Extractum Eucalypti Fluidum, U. S.*) is given in the dose of 10 drops to 2 drachms. The oil (*Oleum Eucalypti, U. S.* and *B. P.*) in the dose of 5 drops.

Unguentum Eucalypti is officinal in the *B. P.*, but is seldom used.

EUONYMUS.

Euonymus, U. S., or Wahoo is the bark of *Euonymus Atropurpureus*, a native of the United States. It contains an active principle Euonymin. As a laxative its action is very slow and moderate but it is thought to act particularly on the liver and may be used when mild *hepatic torpor* is present.

Administration.—The dose of the solid extract (*Extractum Euonymi, U. S.*) is 3 to 10 grains.

EUPATORIUM.

Eupatorium, U. S., Thoroughwort or boneset is the leaves of the *Eupatorium perfoliatum*, an American plant which is used as a simple bitter tonic and diaphoretic very largely in household medicine. The drug is generally given in hot infusion in *arrested menstruation* due to cold, or in the chill of a *remittent* or *intermittent fever*, and also in *anorexia* and *debility*. Its taste is very disagreeable, and in the dose of a pint of the cold infusion it has been used as an emetic. The fluid extract (*Extractum Eupatorii Fluidum, U. S.*) is given in the dose of 30 drops to 1 drachm.

FILIX MAS.

Aspidium, U. S., *Filix Mas, B. P.*, or Male Fern, is employed in medicine as a tæniacide or remedy against the *tape-worm*, and is a very efficient and valuable drug under such circumstances, being, perhaps, the most reliable of all the vermifuges except pelletierin. When employed against the tape-worm the directions and precautions given in the article on Worms must be strictly followed.

Administration.—Male fern is rarely, if ever, used at present in its crude form, being employed most commonly in this country in the form of the oleoresin (*Oleoresina Aspidii*), dose ½ to 1 fluidrachm in capsules, or as follows:

℞.—Oleoresin. aspidii,
Tinct. vanillæ . . . . āā ♏xlv.
Pulv. acaciæ . . . . ʒss.
Aq. destillat. . . . . f℥j.

M.—S. Take entire amount after fasting, and follow in two hours by a full dose of castor-oil or sulphate of magnesium.

The oleoresin (*Oleoresina Aspidii, U. S.*) is given in the dose of ½ to 1 drachm; the dose of the liquid extract *Extractum Filicis Liquidum*) of the *B. P.* is 15 minims to 1 fluidrachm.

FLAXSEED.

Flaxseed or Linseed, (*Linum, U. S.*), is the seed of *linum usitatissimum* or flax from which linen is made; it is officinal in the *B. P.* as *Lini Semina*. It contains an oil and a mucilage, the first of which is largely used in the arts, and the second sometimes employed in medicine. The oil (*Oleum Lini, U. S.* and *B. P.*) is also used by physicians and pharmacists for various purposes.

Therapeutics.—Flaxseed acts as a demulcent to *inflamed mucous membranes*, and is used largely in *acute cystitis, bronchitis, gastritis, nephritis* and similar states in the form of flaxseed-tea. This is prepared by mixing together 3 drachms of flaxseed, not ground, 30 grains of extract of licorice, 10 ounces of boiling water, and allowing the mixture to stand one to four hours in a warm place. If the mixture be boiled the oil is set free and makes the dose disagreeable. This infusion may now be made more tasteful and useful by the addition of a little lemon-juice and sugar and by the placing of from 1 to 2 drachms of gum-arabic in the pitcher containing it. If the cough is excessive, a little paregoric may be added. Linseed oil is used sometimes as a laxative in the dose of 2 ounces, and is said to be of service when so given in *hemorrhoids*.

Flaxseed meal (*Lini Farina, B. P.*) is used universally as a useful poultice.

Under the name of carron oil, an emulsion of lime-water and linseed oil, equal parts, is the standard application to limited or extensive burns.

An infusion of linseed (*Infusum Lini*) and a poultice (*Cataplasma Lini*) are officinal in the *B. P.*

GALLIC ACID.

Acidum Gallicum (*U. S.* and *B. P.*) is prepared from powdered nut-galls by a somewhat complicated and prolonged process. It occurs in nearly colorless, long, needle-like crystals, which are soluble in 100 parts of cold water, 4½ parts of alcohol, and 3 parts of boiling water.

Physiological Action.—Gallic acid is an astringent but not a coagulator of blood. Locally applied in bleeding it is useless, but given internally in hæmorrhages, which cannot be acted upon by tannic acid, it is useful as a hæmostatic. It is eliminated from the body, as gallic acid, by the kidneys.

Therapeutics.—Gallic acid may be used with much success in *hæmaturia, hæmoptysis, colliquative sweats*, and in *bronchorrhœa* with profuse expectoration.

Combined with opium it is one of the best remedies in *diabetes insipidus*, and is even useful in *diabetes mellitus*.

In *albuminuria* dependent upon a relaxed atonic state of the kidneys and in *night-sweats* and *acute or chronic diarrhœa*, gallic acid may be used with advantage. In the form of the ointment it is useful in *psoriasis*, and in *ulcers* and *sores* which are actively discharging.

Administration.—Gallic acid is given in the dose of 2 to 40 grains in pill or solution. It ought never to be used with any salt of iron, as it is incompatible. The officinal preparations are *Unguentum Acidi Gallici, U. S.*, and *Glycerinum Acidi Gallici, B. P.*, given in the dose of 10 to 60 minims.

Nut-galls (*Galla, U. S.* and *B. P.*) are the small excrescences found upon the oak (*Quercus Infectoria*) formed by the ova of the fly *Cynips Tinctoria.* Their sole value depends upon the tannic acid contained in them, and they are officinal in the form of the tincture (*Tinctura Gallæ, U. S.* and *B. P.*), dose ½ to 2 fluidrachms; and the ointment (*Unguentum Gallæ, U. S.* and *B. P.*). *Unguentum Gallæ cum Opio* is officinal in the *B. P.*, and is used as an astringent ointment.

GAULTHERIA.

Wintergreen, or *Gaultheria Procumbens*, is an American evergreen containing a volatile oil. The oil possesses a peculiar, exceedingly penetrating smell and a warm aromatic taste. It is about 90 per cent. salicylate of methyl.

Physiological Action.—Owing to the large amounts of salicylate of methyl contained in the oil its physiological action is almost identical with that of salicylic acid. (Wood and Hare.)

Therapeutics.—Aside from its use as a flavoring substance, oil of gaultheria is largely used in all forms of *rheumatism*, and in place of the ordinary salicylates. It does not so commonly disturb the digestion of patients as do the salts of salicylic acid or the acid itself. The oil (*Oleum Gaultheriæ, U. S.*) is best given in capsules or emulsion, or dropped on a teaspoonful of sugar, three times a day after meals. The dose may be as high as 100 drops a day; if 60 drops three times a day, do no good, pushing it further is useless.

The spirit of gaultheria (*Spiritus Gaultheriæ, U. S.*) is given in the dose of 10 to 20 minims.

GELSEMIUM.

Gelsemium, U. S. and *B. P.*, or yellow jasmine, as used in medicine, is the rhizome of the *Gelsemium Sempervirens*, a climbing plant of the southern United States. It contains an alkaloid Gelsemine and Gelseminic acid.

Physiological Action.

NERVOUS SYSTEM.—Gelsemium paralyzes the spinal cord, particularly on its sensory side (?), although the motor side is certainly ultimately depressed. It does not influence the nerves or muscles except those of the head, on which it acts as a paralyzant to the motor fibres.

CIRCULATION.—Gelsemium is a depressant to the circulation, acting particularly on the heart.

RESPIRATION.—Gelsemium kills by paralyzing the respiratory centres (Sanderson, Ringer, and Murrell).

TEMPERATURE.—In overdose the drug lowers bodily heat very markedly.

EYE.—Gelsemium is a mydriatic of considerable power, causing, when dropped into the eye, wide dilatation of the pupil, a result due to paralysis of the oculo-motor nerve. It is apt to cause temporary internal squint owing to its paralyzant action on the sixth pair of cranial nerves.

Therapeutics.—Gelsemium is used in *headache* and *migraine* depending on nervous troubles or *eye-strain.* It is particularly useful in combination with cannabis indica. (See Cannabis Indica and Migraine.)

In *malarial fever* it is said to be of great service, but this is doubtful. In *pneumonia* and *pleurisy* it has been highly spoken of by Bartholow.

Gelsemium has also been found of value in *asthma*, *whooping-cough*, *laryngismus stridulus*, and *nervous cough*. In localized *muscular spasm*, as is seen in *torticollis* or *wry-neck* and in *spasmodic dysmenorrhœa*, it is of considerable service. It ought not to be used if the system is already depressed, but be employed in strong sthenic cases.

When used as a *mydriatic* Tweedy recommends it as equal to atropine in effect, but much more transient in its influence. He uses a solution of 8 grains of gelsemine to the ounce of water, instilled, drop by drop, into the eye every fifteen minutes for one hour, and then every half hour for two hours.

Poisoning.—The most prominent symptoms of gelsemium poisoning are ptosis and dropping of the jaw. This is preceded by a sensation of languor, a desire to lie down, relaxation and muscular weakness The pulse becomes rapid and feeble, the skin wet and cold, the face pinched and anxious, the voice loses itself in aphonia, and death ensues from centric respiratory failure and an almost simultaneous cardiac arrest. Sensation in man is impaired very late in the poisoning.

Treatment of the poisoning consists in the use of cardiac stimulants, such as ammonia, digitalis, and atropine, the application of external heat, and the employment of atropine and strychnine for the respiratory centre. Emetics and the stomach-pump are, of course, to be employed.

Administration.—The fluid extract (*Extractum Gelsemii Fluidum, U. S.*) is given in the dose of 5 to 10 minims, and the tincture (*Tinctura Gelsemii, U. S.* and *B. P.*) 10 to 20 drops. Gelsemine may be used in the dose of $\frac{1}{70}$ of a grain. *Extractum Gelsemii Alcoholicum, B. P.*, is given in the dose of ½ to 1 grain.

GENTIAN.

Gentiana, U. S., is the root of the *Gentiana Lutea* or yellow gentian, a European plant. It contains gentianine and gentisic acid and has a bitter taste. This drug is officinal in the *B. P.* as *Gentianæ Radix.*

Therapeutics.—Gentian is one of the most efficacious bitter tonics that we possess, as well as one of the most elegant. In the *anorexia* following acute diseases and in *gout* and *malarial poisoning* with *dyspepsia* it is of service. Combined with bicarbonate of sodium it is of great service in the *gastric and intestinal catarrh* of children.

Administration—The compound tincture (*Tinctura Gentianæ Composita, U. S.* and *B. P.*) is given in the dose of a drachm to a wineglassful, the fluid extract (*Extractum Gentianæ Fluidum, U. S.*) in the dose of 30 drops to a drachm, and the solid extract (*Extractum Gentianæ, U. S.* and *B. P.*) in the dose of 1 to 8 grains. *Infusum Gentianæ Compositum, B. P.*, is given in the dose of 1 to 2 fluidounces, and the compound tincture (*Tinctura Gentianæ Compositus*) in the dose of ½ to 1 fluidrachm. The compound tincture and infusion are composed of gentian, bitter orange peel, and cardamoms.

GERANIUM.

Geranium, U. S., is the rhizome of *Geranium Maculatum.* It contains tannic and gallic acid and is useful in diarrhœa as an astringent. It is not the common red geranium seen in flower gardens.

In *infantile diarrhœa* geranium root boiled in milk in the proportion of one or two roots to the pint will be found of great service, and is lacking in taste. The dose of the drug itself is 20 to 60 grains, and that of the fluid extract (*Extractum Geranii Fluidum, U. S.*) ½ to 1 fluidrachm.

GINGER.

Zingiber, U. S. and *B. P.*, in the rhizome of *Zingiber Officinale*, a plant of Hindoostan, Jamaica, and other tropical counties. Black ginger is the dried rhizome with its bark, while white ginger has this covering removed. It contains a hot volatile oil and an aromatic resin and is very largely used in domestic medicine as a carminative and stomachic. In *menstrual cramps* it is often given and is particularly useful in those due to suppression from cold. With purgative medicines it is employed for its flavor and the prevention of *griping*. Of itself it is decidedly constipating, and when used in *diarrhœa* mixtures is of value other than as a flavoring addition to the prescription.

Administration.—The fluid extract (*Extractum Zingiberis Fluidum, U. S.*) is given in the dose of 10 to 30 drops, well diluted. The tincture (*Tinctura Zingiberis, U. S.* and *B. P*), 20 drops to 2 drachms; the syrup (*Syrupus Zingiberis, U. S.* and *B. P.*), dose, 30 drops to 2 drachms; the oleo-resin (*Oleoresina Zingiberis, U. S.*), dose, ½ to 1 drop, well diluted, or in pill, and the troches (*Trochisci Zingiberis, U. S.*) used as stimulants to salivary secretion. In the *B. P.* a stronger tincture, *Tinctura Zingiberis Fortior*, is officinal, dose 5 to 20 minims.

GLAUBER'S SALTS, OR SULPHATE OF SODIUM.

Sodii Sulphas, U. S. and *B. P.*, is one of the most irritant of the saline purges, rarely used in human medicine, but largely employed by veterinarians. The purgative dose for man is half an ounce to an ounce. If any inflammation is present it is contra-indicated. It produces large watery stools, with a good deal of griping, Sulphate of sodium is a prominent constituent of Carlsbad water, Hunyadi Janos, Hunyadi Arpad, and similar waters.

GLYCERIN.

Glycerinum, U. S. and *B. P.*, is a liquid obtained by the decomposition and distillation of fats. It possesses great power of absorbing water and of dissolving many substances. Even if pure it irritates the skin of susceptible persons by its absorption of water, causing a slight rash.

Physiological Action.—Injected into the circulation it causes, in large amounts, convulsions, which are due to its hydroscopic powers.

According to the clinical researches of Pavy, glycerin increases the polyuria of diabetes almost one-half, and for this reason he thinks it is not to be employed in this class of cases as a substitute for sugar. Again, the experiments of Luchsinger and Weiss have seemed to show that the administration of this substance increases the amount of glycogen in the liver to very considerable extent; while, on the other hand, the researches of Eckhard and Luchsinger have also proved that glycerin very frequently tends to prevent glycosuria when brought about by puncture of the so-called diabetic centre in the floor of the fourth ventricle, if the drug be given hypodermically. Luchsinger, therefore, believed that while glycerin might increase the amount of glycogen, it also prevented its transformation into sugar by inhibiting the amylolytic action of the hepatic ferment. Eckhard believes that the hypodermic injection of glycerin produces such radical changes in the blood and general system that no conclusion can be made of the proper influence exerted by it. In an exceedingly useful and interesting paper, both from a physiological and clinical standpoint, Ransom, of London, has recently gone over this work in a satisfactory manner, and has tried, with considerable success, to unravel the somewhat complex function of the part, as well as the equally complex opposing statements of investigators. He points out that one element of fallacy in all these experiments is the fact that glycerin, when given hypodermically, must reach the liver so slowly and in such a diffused state as to be almost powerless, and, in consequence, Ransom introduced the glycerin into the alimentary canal. All the experiments seem to have been made in a most painstaking and careful manner, and, as we have not space for their detail, we must pass them by in order to reach the results attained. They are as follows: 1. Certain forms of glycosuria may be checked by glycerin. 2. Glycerin acts more efficiently when introduced into the alimentary canal than when injected subcutaneously. 3. Glycerin checks glycosuria by inhibiting the formation of sugar in the liver. 4. By this means glycerin increases the quantity of glycogen found in the liver. While these conclusions are not final in proving the value of glycerin under such circumstances, it would seem probable that they are of great value in pointing toward a solution of one of the most complex subjects with which physicians are called upon to deal, and it is to be hoped that Ransom will publish other researches at a future time, which will further elucidate this difficult subject. The quantity of glycerin which the writer would recommend to be given clinically is 1 drachm diluted with water at least one-half.

Therapeutics.—Glycerin may be employed as a sweetening agent in the food of *diabetics* and in cases where sugar cannot be used. It has also been given as a laxative in 1 or 2 drachm doses by the mouth, and in enema of 1 to 4 drachms with or without equal parts of water. In some cases it may be used in suppository. This latter way is very successful in *chronic constipation.*

As an antiseptic it is used for preserving specimens and alkaloids in solutions for hypodermic use.

In *acute coryza,* applied by a spray or brush to the nostrils, it is often of service. If used on the skin it should be diluted one-half with water. In cases of *impacted cerumen* in the external auditory canal it is often of service to soften the mass.

The uses of glycerin, other than those mentioned, are many. In the proportion of 1 part of glycerin and 1 of water it makes a very useful mouth-wash on a rag in the *sore* and *dry mouth of typhoid fever* and for the removal of *sordes*. The same wash, with lemon juice added to it, relieves the dry, glazed tongue of advanced *phthisis*.

Owing to the fact that glycerin is hydroscopic, it may be used on a pledget of cotton in congestion of the uterine cervix as a depletant, the tampon being renewed daily.

For the prevention of *bed-sores* Ringer recommends the daily washing and rubbing of the part likely to be affected, followed by the application of glycerin, and a draw-sheet placed smoothly against the patient to protect the bedding.

Glycerin and whiskey is a favorite household remedy for *colds* and *coughs*, but is not very useful. Plasma, or glycerite of starch (*Glyceritum Amyli, U. S.* and *B. P.*), is used as a protective. Glycerite of yolk of egg (*Glyceritum Vitelli, U. S.*) is used in making emulsions.

The *B. P.* preparations of glycerin are as follows: *Glycerinum Acidi Carbolici; Glycerinum Acidi Gallici; Glycerinum Acidi Tannici; Glycerinum Aluminis; Glycerinum Boracis; Glycerinum Plumbi Subacetatis*, and *Glycerinum Tragacanthæ.*

GRINDELIA ROBUSTA.

Grindelia, U. S., is an American plant (*Grindelia Robusta*) containing a resin, a volatile oil, and an alkaloid.

Physiological Action.—Upon the lower animals and man this drug is not very powerful in its action, but may cause, in large doses, paralysis of the peripheral sensory nerves, the sensory centres in the cord, and finally the motor centres and nerve-trunks. It slows the heart by stimulating the vagi, and raises blood-pressure by stimulating the vaso-motor centre.

Therapeutics.—This is an exceedingly useful remedy in some cases of *asthma*, and in *bronchitis* in its later stages. It may be given in the dose of 20 to 60 drops of the fluid extract (*Extractum Grindeliæ Fluidum*), or by means of inhaling the fumes of burning grindelia leaves which are previously soaked in a solution of nitre, dried, and burned on a plate, or rolled into a cigarette and smoked. In *chronic cystitis* it stimulates the bladder, and is of great service. By diluting it 1 to 10 with water it forms one of the best lotions we have for the poisoning by poison ivy or *Rhus Toxicodendron.*

Administration.—The only preparation which is officinal is the fluid extract (*Extractum Grindeliæ Fluidum, U. S.*), dose 20 to 60 drops.

GUAIAC.

Lignum Vitæ is *Guaiacum Officinale*, a West Indian tree. It is used in medicine in two forms—namely, as Guaiac wood (*Guaiaci Lignum, U. S.* and *B. P.*), which is in raspings and enters into the compound syrup of sarsaparilla, and Guaiac resin (*Guaiaci Resina, U. S.* and *B. P.*) or Guaiac, which is soluble in alcohol, ether, and chloroform, but insoluble in water.

Therapeutics.—Guaiac has been used largely in *syphilis* but is now almost discarded. Given in *acute tonsillitis* in the dose of 30 grains in an emulsion made by the use of white of egg it will often abort the disease. In *rheumatism* it has been largely used. The ammoniated tincture of guaiac is sometimes employed in *sore throat*, particularly if it be rheumatic in type, but is a disagreeable preparation to take into the mouth.

Administration.—The tincture (*Tinctura Guaiaci, U. S.*) is given in the dose of 5 to 60 drops, and the ammoniated tincture (*Tinctura Guaiaci Ammoniata, U. S.* and *B. P.*) is used in the same dose, preferably in milk. *Mistura Guaiaci, B. P.*, is given in the dose of 1 to 1½ fluidounces.

GURJUN OIL.

Gurjun Oil, or, as it is sometimes called, Gurjun Balsam, or Wood Oil, is the exudation obtained, by incision and the application of heat, from the bark of an East Indian tree. It is a transparent liquid possessing the consistency of olive oil, of a greenish-gray color when held up to the light. It has an aromatic odor resembling to some extent that of copaiba. It is not, however, so disagreeable.

Therapeutics.—Gurjun oil has been found of value in cases of *chronic bronchitis* where a stimulating expectorant of considerable power was desired, and this is particularly the case if the mucus in the bronchial tubes is very tenacious. The oil has also been found of value in *gonorrhœa* and *gleet* in place of copaiba and cubebs.

Administration.—Gurjun oil is best given in the dose of from 1 to 2 drachms three times a day, combined with spirit of nitrous ether, mucilage of acacia and cinnamon water, or mixed with extract of malt in the proportion of 2 drachms of the oil to an ounce of the extract. Persons having irritable stomachs may not be able to take this drug.

HAMAMELIS.

Hamamelis, U. S., Witch-hazel, or *Hamamelis Virginica*, is a plant of the United States, devoid of any true active principle, but possessing extraordinary power.

According to the studies of Wood and Marshall it has absolutely no physiological action, yet practically we know it to be a most useful remedy.

Therapeutics.—Hamamelis is wonderfully successful in the treatment of *uterine oozing* from small bloodvessels, seems to do good even in *hæmatemesis* and *hæmoptysis*, and will sometimes arrest *hæmaturia* when all other remedies fail. Applied by means of cloths to *leg ulcers* it acts very thoroughly, and relieves the angry-looking skin at once. In *bleeding from the bladder* it may be injected into that viscus daily in the form of the distilled fluid extract. Taken internally and applied locally it is of value in bleeding and the so-called blind piles.

Injected into the part or taken internally hamamelis is of value in *varicose veins.*

Administration.—The one officinal preparation is the fluid extract (*Extractum Hamamelidis Fluidum, U. S.*), dose 5 to 20 drops The dose of the distilled extract, which is not officinal, and is a perfectly clear liquid, is from 30 drops to 1 drachm, and is much the best preparation for internal and external use. Unfortunately the preparations of the drug vary very much both in odor and efficacy.

HÆMATOXYLON.

Hæmatoxylon, U. S., Hæmatoxyli Lignum, B. P., or Log-wood is the heart-wood of *Hæmatoxylon Campechianum*, a tree of the American tropics. It contains an alkaloid hæmatoxylin.

Therapeutics.—Hæmatoxylon is a mild astringent, very useful in *serous diarrhœas* and in the diarrhœas of young children, as they do not dislike it, owing to its agreeable taste. (See article on Diarrhœa.) As it colors the stools and urine red, the nurse should be warned, lest she be alarmed at the sight of what looks like blood on the diaper when the drug is given to infants. In *leucorrhœa* its internal use is of service. The extract (*Extractum Hæmatoxyli, U. S:* and *B. P.*) is given in the dose of 8 to 30 grains, and *Decoctum Hæmatoxyli, B. P.*, 1 to 2 fluidounces.

HOFFMANN'S ANODYNE.

Spiritus Ætheris Compositus, U. S. and *B. P.*, consists of alcohol, ether, and the heavy oil of wine. The writer has experimentally studied very thoroughly the action of the last-named ingredient, and finds:

First. That the belief in heavy oil of wine being the quieting agent in Hoffmann's anodyne is fallacious.

Second. That the calmative effects of this mixture depend largely on the ether, rather than on the oil.

Third. It would seem probable that in Hoffmann's anodyne we possess an agent in which there are linked together three drugs of undoubted power, each one of which successively substitutes the other, stimulating the system in the order here named, viz, ether, alcohol, and the heavy oil of wine.

On animal temperature, as ascertained by the thermometer in the rectum, no effect is produced, even when the arterial pressure is very low. That large doses of the heavy oil of wine are in no way possessed of toxic effects is proved by the fact that 30 c.c. of the drug given by the mouth to a small dog, weighing twelve pounds, failed to produce any apparent symptoms, except, perhaps, to stimulate him slightly. While the odor of the oil is penetrating it is by no means disagreeable, and it possesses but little taste other than that of the presence of an oily substance.

Therapeutics.—Hoffmann's anodyne is the best carminative that we possess for general use, and is one of the best remedies for *singultus* or *hiccough*. These influences are accomplished probably in two ways: The alcohol and ether act as irritants or stimulants to the gut and free peristalsis results, while the heavy oil of wine perhaps acts as a nervous sedative. In *angina pectoris* this combination is often the best remedy we have, and in the cardiac palpitation of *tobacco-heart* or that arising from indigestion it is very useful.

In the nausea and depression seen after excessive smoking, Hoffmann's anodyne should always be given in capsules or in cold water, preferably ice cold in order to prevent too rapid volatization of the ether and consequent difficulty in swallowing.

The dose is 1 to 2 drachms to an adult.

HOMATROPINE HYDROBROMATE.

Hydrobromate of homatropine, properly applied by frequent instillations, is a reliable mydriatic for the correction of anomalies of refraction in healthy eyes. Experience is not at hand to determine its value for this purpose in eyes affected with retino-choroidal disturbance. Atropine and hyoscyamine are preferred under such circumstances, for the obvious reason that their prolonged action is desirable as a method of treatment. The danger of systemic disturbance from homatropine is far removed, even when repeated instillations have been made and its temporary action upon the pulse causes no inconvenience to the patient. Slight hyperæmia of the conjunctiva almost invariably follows its use, and true conjunctivitis, if it occurs at all, must be excessively rare. According to the studies of Dr. de Schweinitz and the writer, the drug has a physiological action closely allied to that of atropine, from which it is derived. Homatropine mydriasis generally lasts from 36 to 48 hours, that of hyoscyamine 8 to 9 days, and that of atropine 10 to 12 days. For the production of ordinary mydriasis the drug should be used in solution of the strength of 4 grains to the ounce of distilled water which is to be dropped into the eye every 5 or 10 minutes.

HONEY.

Honey, or *Mel, U. S.* and *B. P.*, is the saccharine fluid deposited in combs by the honey bee or *Apis Mellifica.* It is used to cover the taste of disagreeable medicines. When it is abstracted from a peculiar variety of flowers it frequently has the odor of the flower, and may even produce the physiological effects of the plant when taken internally. This occurs commonly in those parts of the country where the bees have had access to mountain laurel and similar plants.

Therapeutics.—Honey is used as an emollient in gargles and to relieve *cough* and *dryness of the mouth and fauces.* When used as a gargle it very distinctly increases the secretion of the mucous membrane, and so relieves the congestion.

Under the name of *Oxymel* the *B. P.* recognizes a mixture of 8 parts of honey, 1 of acetic acid, and 1 of water. This is generally used as a vehicle for more active remedies in gargles, or even for expectorant mixtures. Melted and strained honey is known as *Mel Despumatum, U. S.*, and *Mel Depuratum, B. P.* There are also a honey of roses (*Mel Rosæ, U. S.*) and a confection (*Confectio Rosæ, U. S.*) used as vehicles for other drugs.

HOPS.

Humulus, U. S., are the strobiles of ordinary hops or *Humulus Lupulus.* They contain a liquid volatile alkaloid lupulin and a bitter principle lupulinic acid. Hops are known under the name of *Lupulus* in the *B. P.*

Therapeutics.—Hops are used as *antispasmodics* and *nervous sedatives* in cases of *hysteria* and *nervousness.* In *priapism, vesical irritability*, and *renal irritation* they are of service. Even in *delirium tremens* they seem to be of value. For locally application a hop poultice may be made by placing the powdered strobiles in the mass, and employed in this way they are a favorite home remedy for local, *painful inflammations.* Hops have been used in the form of a hop pillow in *nervous insomnia*, but this influence is largely imaginary, or depends on the fumes of the alcohol with which the pillow is moistened.

Administration.—The tincture (*Tinctura Humuli, U. S.*) is given in the dose of ½ to 3 ounces, the alkaloid (*Lupulinum, U. S.* and *B.P.*), dose 2 to 5 grains or more; the oleoresin of lupulin (*Oleoresina Lupulini, U. S.*), dose 10 to 40 drops in capsules, and the fluid extract (*Extractum Lupulini Fluidum, U. S.*), in the dose of 30 to 120 drops. The preparations of the *B. P.* are the extract (*Extractum*

Lupuli), dose 5 to 10 grains; the infusion (*Infusum Lupuli*), dose 1 to 2 fluidounces, and the tincture (*Tinctura Lupuli*), dose ½ to 2 fluidrachms.

HOPE'S CAMPHOR MIXTURE.

This is a mixture originally made with nitrous acid, but largely used at present with nitric acid, owing to the fact that nitrous acid is changed into nitric acid when water is added to it. The nitrous acid is, however, more efficacious than nitric acid in the *serous or choleraic diarrhœas* which it is used to combat. The formula is as follows:

℞.—Acid. Nitrosi	fʒj.
Aquæ Camphoræ	f℥viij.
et add.	
Tinct. opii	gtt. xl.

S.—One-fourth of this every three or four hours.

HYDRASTIS.

Hydrastis, U. S., is the rhizome of the *Hydrastis Canadensis* containing two alkaloids, known as hydrastine and berberine, and, perhaps, xanthopuccin.

Physiological Action.—In poisonous doses hydrastis may cause convulsions followed by paralysis, according to the quantity of berberine or hydrastine present. The latter is more convulsive in its effects than the former. Upon the circulation hydrastine, when injected into the jugular vein, causes a primary fall of arterial pressure succeeded by a decided rise, and the studies of Dr. Cerna, in the laboratory of the University of Pennsylvania, have proved that it is an active poison producing convulsions followed by paralysis.

Therapeutics.—Hydrastis is of service in *chronic gastro-intestinal catarrh*, particularly that following the abuse of alcohol, and may be used as a stomachic and tonic after malarial fever and similar depressing diseases. Wherever membranes exist in a condition of lowered tone this drug will be indicated. Thus in *catarrhal jaundice* of a subacute type, in *uterine catarrh*, in *leucorrhœa* dependent upon a relaxed state of the vagina, and in *chronic nasal inflammations* and irritations it will be found useful.

Tincture of hydrastis is said to possess a distinct *anti-malarial* influence.

One of the best remedial measures that we have in the later stages of *gonorrhœa*, when the acute period has passed, is the local and internal use of hydrastis. If it is used as an injection 5 grains of the commercial hydrastine to each ounce of water should be employed twice a day. If this is not used the following infusion will be found of service: Take 1 drachm of the powdered root and add it to 8 ounces of boiling water. Half to one drachm of the fluid extract may also be added to a pint of water and used as a wash in *vaginal gonorrhœa* and *leucorrhœa*. In *chronic dyspepsia* it seems to act as an antiseptic and as a curative agent to the mucous membranes of the stomach.

Administration.—The fluid extract (*Extractum Hydrastis Fluidum*, *U. S.*) may be given in the dose of 5 to 30 drops, while the dose of the tincture (*Tinctura Hydrastis*, *U. S.*) is from 30 drops to 2 drachms.

Much doubt exists as to the dose of hydrastine. This arises from the fact that two forms of it are sold. That most commonly seen is impure, and contains berberine and other substances. Its dose is 3 to 10 grains. The pure hydrastine, made by Merck, is given in the dose of ¼ to ½ grain.

HYDROCHLORIC ACID.

Acidum Hydrochloricum (*U. S.* and *B. P.*) is a clear, colorless liquid, possessing an acid odor and taste, devoid of astringency, but in concentrated form decidedly caustic. In the strength of two-tenths of 1 per cent. it is present normally in the gastric juice and aids the pepsin in the conversion of proteids into peptones, and in the formation of pepsin from pepsinogen.

Therapeutics.—In *dyspepsia* due to faulty gastric secretion, as in typhoid fever and in *gastric indigestion*, accompanied with fermentation, this acid is of service. In combination with compound tincture of cardamoms it is of value in intestinal indigestion. The acid is best used in the form of the officinal dilute acid (*Acidum Hydrochloricum Dilutum*, *U. S.* and *B. P.*), dose 10 to 30 drops in water.

In the *sick stomach* and for gastric distress following an *alcoholic debauch*, 20 drops of the dilute acid in water are often of service.

This acid is combined with nitric acid to form dilute nitro-hydrochloric acid (*Acidum Nitro-hydrochloricum Dilutum*, *U. S.* and *B. P.*), the dose of which is 10 to 30 minims; also the pure acid (*Acidum Nitro-hydrochloricum*, *U. S.*).

Hydrochloric acid causes, when taken in poisonous doses, violent *gastro-enteritis* and corrosion of the gastric walls, and should be combated by alkalies, soap, oils, and white of egg.

HYDROCYANIC ACID.

Hydrocyanic or Prussic Acid is a transparent, colorless, very volatile liquid, giving rise to vertigo when slightly inhaled and to death if the fumes be concentrated. If the bottle containing the pure drug be opened it should be done where there is sufficient draught between windows to prevent any contamination of the atmosphere by the acid.

Pure hydrocyanic acid is never used in medicine, but it is employed in the form of the dilute acid (*Acidum Hydrocyanicum Dilutum, U. S.* and *B. P.*), which contains about 2 per cent. of the drug. It must be kept in dark, tightly-stoppered bottles.

Physiological Action.—This is one of the most rapid, if not the most rapid lethal poison known, only being approached by carbolic acid. Owing to its volatility it is absorbed with great rapidity, and acts upon the respiratory centre and the heart, being eliminated almost immediately afterward. As a consequence, the survival of a patient twenty or thirty minutes after the ingestion of a dose is a favorable sign.

The drug is an active paralyzant and lethal agent to every part of the body. The nervous system, heart, respiration, brain, and all parts are killed by it at once if much of it is present.

Poisoning.—Death either comes on at once, so that the person drops dead to the floor with a gasp, is for a moment convulsed, the face cyanotic, the eyes wide open, with the teeth tightly shut, and the lips covered by a bloody froth, or, three stages of poisoning may ensue if the dose has not been very large. In the first of these there is difficult respiration, slow cardiac action, and disturbed cerebration. In the second stage, which is convulsive, we find wild cries, dilated pupils, unconsciousness, vomiting, spasmodic urination and defecation, erections of the penis and ejaculations of semen. In the third stage there is asphyxia, collapse, and paralysis, ending in death. The blood is found to be dark, and venous-looking, but does not give the spectrum bands of cyano-hæmoglobin. These bands only appear when the drug is shaken with the blood outside the body.

The diagnostic signs of death from prussic acid are the odor on the body, the wide-staring eye, the clinched teeth covered with froth, and the livid, cyanosed face. If the body be opened the odor of hydrocyanic acid is marked, but rapidly passes away.

The only poisoning resembling this is that produced by nitrobenzole or essence of mirbane, which has a somewhat similar odor, but which is more permanent the odor remaining in the opened body for hours.

Therapeutics.—Hydrocyanic acid is useful in cases of *gastralgia* of purely nervous origin, and in some cases of *nervous vomiting* and in *irritable stomach* where, owing to a hyperæsthesia of the mucous membranes, the taking of food produces discomfort.

In *irritable coughs*, due to tickling in the throat and bronchi, it is very extensively used, and has received high praise by those best qualified to judge. On the other hand, it has been claimed that owing to the extreme volatility of the drug it only acts for the moment, and that a dose every ten or fifteen minutes is necessary to produce really any effect. However this may be in theory, practically it certainly does relieve cough. In these states the following prescription will be found of service:

℞.—Acid. hydrocyan. dil.	fʒj.
Morphinæ sulph.	gr. ij.
Syrup. pruni virg.	f℥iij.

M.—S. Teaspoonful every four or five hours to an adult.

In *enteralgia* or *neuralgia* of the intestines, prussic acid is very useful.

Externally the drug is useful in *pruritus* and other forms of *itching skin diseases*, and the following formula will be found of service in *pruritus vulvæ*:

℞.—Hydrarg. bichlorid.	gr ss.
Acid. hydrocyanic. dil.	fʒj.
Aquæ amygdal. amaræ	f℥vj.

M.—S. Apply to the itching surface with a small rag.

The same prescription may also be employed in pruritus without the bichloride, if so desired. The dose of dilute hydrocyanic acid is 1 to 5 drops. In certain forms of irritable cough inhalations of the vapor (*Vapor Acidi Hydrocyanici, B. P.*) are recommended; it is prepared by adding 10 to 15 minims of the diluted acid to 1 fluiddrachm of water, which is then placed in a suitable apparatus from which the vapor that arises is inhaled.

HYOSCYAMUS.

Hyoscyamus, U. S., or Henbane, is a plant of the northern United States and Europe. The leaves (*Hyoscyami Folia, B. P.*) are only used, and from them are obtained two alkaloids, one known as hyoscyamine, the other as hyoscine. The first has the same physiological action as atropine (see Belladonna). The second is quite different in its influence over the body. The only marked difference in the action of hyoscyamine and atropine is in the mydriasis produced by each. While that of atropine lasts, in man, from twelve to fourteen days hyoscyamine generally remains for only seven to nine days. Owing to the presence of hyoscine in hyoscyamus it is more quieting and depressing to the nervous system than is belladonna.

Therapeutics.—Hyoscyamus is used in every condition indicating the employment of belladonna; or, in other words, wherever *local spasm*, or *arterial relaxation* exists or where pain is due to *spasm*. It has been particularly recommended in *nervous cough*, in *whooping-cough*, and in *colic*, and probably is better in its influences in these states than is belladonna. In combination with nitrate of silver the extract may be used with advantage in *chronic gastric catarrh.* In *urinary incontinence* due to *irritable bladder* it is very serviceable, and particularly is this true of children and old persons.

Administration.—The drug itself is officinal in four forms, and as hyoscyamine sulphate. The dose of the tincture (*Tinctura Hyoscyami, U. S.* and *B. P.*) is 30 drops to 1 drachm; the alcoholic extract (*Extractum Hyoscyami Alcoholicum, U. S.*), dose 1 to 3 grains; the alkaloid (*Hyoscyaminæ Sulphas, U. S.*), dose $\frac{1}{60}$ to $\frac{1}{50}$ of a grain; the abstract (*Abstractum Hyoscyami, U. S.*), dose 2 to 3 grains; and the fluid extract (*Extractum Hyoscyami Fluidum, U. S.*), dose 5 to 30 drops. The *B. P.* preparations besides those given are the extract (*Extractum Hyoscyami*), dose 5 to 10 grains, or more, and the juice (*Succus Hyoscyami*), dose 30 minims to 1 fluidrachm.

Hyoscine.

This is one of the alkaloids derived from hyoscyamus and is a powerful nervous depressant.

Physiological Action.—Hyoscine quiets the cerebrum and produces deep sleep in a certain class of patients. In the lower animals, or in man, it may cause sleep or wild delirium. It causes loss of reflex action in overdose, which is due to paralysis of the spinal cord and not of the nerve-trunks. Upon the circulation it has little effect, but it is worthy of note that it does influence the vagus nerves, as does atropine, stimulating them at first, and finally paralyzing them, although the contrary has been asserted. In any event the circulatory effect is a minor one.

Therapeutics.—Hyoscine is of value as a *hypnotic* in a very limited class of cases, but in this class generally acts most favorably. This class consists of those who, from acute mania, alcoholic mania, hysteria, or similar cause, suffer from *insomnia*, and perhaps use violent struggles against proper control, or refuse to swallow or retain food.

The drug may be given to such persons hypodermically, in the dose of $\frac{1}{10}$ to $\frac{1}{90}$ of a grain, or by the mouth in the dose of $\frac{1}{90}$ to $\frac{1}{80}$ of a grain. The fact that it possesses no taste, and is small in bulk, also renders it ready of employment. In some cases it utterly fails, even in this particular type of cases.[1] In delirium tremens it may cause evidences of cerebral congestion and Cheyne-Stokes breathing.

Hyoscine is of great value in *spermatorrhœa* and *nocturnal emissions.*

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[1] The writer has given one-tenth of a grain of Merck's hyoscine in twenty-four hours, obtained from two different and reliable stores, without producing sleep, although the respirations were much quickened.

The drug is contra-indicated in the sore-throat of scarlet fever, as it may cause glottic spasm. In the insomnia of heart disease with nervousness it will cause sleep, but may also produce death by respiratory failure or cardiac arrest, and it is to be remembered that the drug will produce asthma rather than relieve it. The breathing, in ordinary cases, may become croupy or rasping.

ICHTHYOL.

Ichthyol is a substance obtained by distillation from a peculiar resinous deposit found chiefly in the Tyrol, and supposed to be the result of a deposit of extinct fish. Ichthyol occurs as the ichthyo-sulphate of sodium or ammonium. Both of these contain about 10 per cent of sulphur and it is largely upon this that their therapeutic activity depends.

Therapeutics.—Ichthyol is without doubt one of the most remarkable substances used for medicinal purposes which has appeared in the last decade. In *skin diseases* it has been most highly recommended on both sides of the Atlantic, and is employed in form of ichthyol ointment in *chronic eczema, acne, urticaria,* and even on *lupus* and *keloids.* In almost all chronic skin affections it is of the greatest value, and the writer has seen it exert a most favorable influence upon *erysipelas* in hospitals and in his private practice. Under these circumstances the ointment should contain about 20 per cent. of ichthyol, or less. It has also been found by the writer most efficacious in the pain and swelling accompanying acute rheumatism of the joints, both during and after the acute stage of the disease. The strength for this use should be about 30 per cent. of ichthyol to 70 of benzoinated lard. In *frost-bite, chilblains,* and in *burns* it is of service, and Agnew has recommended it highly when rubbed into *lymphatic enlargements.*

For *acute sprains,* and for the removal of the swelling following such injuries, its influence is extraordinary if it be well rubbed into the part affected.

IRON.

Iron (*Ferrum, U. S.* and *B. P.*) is a metal and a food. A food because it forms part of the body when taken into the organism and is used by the system in the making of blood. The number of its officinal salts and compounds is absurd, and half the list is rarely, if ever, used.

Physiological Action.—Iron has little or no effect upon the system when given in a single dose, but repeated doses cause an increase in the number of red blood-corpuscles, plethora, or an increase in the quantity of the blood. Iron is eliminated from the system by the liver, and perhaps by the kidneys. If given in excessive doses it is changed into the sulphide and escapes with the fæces. It has been asserted that it is never released from the body, but this is untrue. Whether it acts as a stimulant to blood manufacture, or simply supplies the glands with blood-making material, we do not know. Iron probably increases the activity of the body to some extent, and thereby causes oxidation to go on more rapidly by reason of its peculiar power of converting oxygen into ozone. The studies of Skvortzoff are interesting in connection with this subject. He found: 1. That iron has no marked influence on nitrogenous metamorphosis in the healthy body. 2. The ingestion of iron in daily doses of 0.02 to 0.03 gramme (0.3 to 0.5 grain) causes a very slight decrease in the assimilation of the nitrogenous portions of the food. 3. After bleeding the assimilation of nitrogenous substances increases a little, whether iron is used or not; but if iron is used at this time the hæmoglobin is rapidly reproduced, and the drug would seem to be of value in restoring the bodily weight.

The preparations of iron consist in the soluble and insoluble salts or forms. Of these the insoluble are probably better than the soluble, but this is by no means to be thought a recognized fact.

Therapeutics.—The chief indication for iron is *anæmia* (see Anæmia), and its contra-indication is plethora. When used in small doses, ½ to 1 grain, it is quite as efficacious as in large amounts and less apt to disorder the stomach. It should not be used as a tonic unless some direct indication for its employment is present, and no drug is more abused in this respect than iron. As each of its preparations possess some peculiarity the use of each will be considered separately.

Reduced Iron.

Quevenne's iron (*Ferrum Redactum, U. S.* and *B. P.*) is an iron gray or reddish powder which is frequently adulterated with lampblack. If it is pure it should burn in sparks when dropped into a flame, but if lampblack is present this will not occur. It should also yield no sulphuretted hydrogen on adding sulphuric acid to it. It is tasteless, and may be given to children for this reason in pills or gum-drops or placed inside of small chocolate creams or in the form of Troches (*Trochisci Ferri Redacti, B. P.*), each lozenge containing 1 grain of the reduced iron. It is used solely in anæmia and is one of the least astringent of the iron preparations.

Chloride of Iron.

Tincture of the chloride of iron (*Tinctura Ferri Chloridi, U. S.*), often called tincture of the muriate of iron, is one of the best and most useful preparations of iron that we have. It is the most diuretic preparation of iron. This diuretic effect does not depend upon the presence of a muriatic ether as has heretofore been taught, since hydrochloric ether is not present and is hard to prepare, except there be an excess of chlorine present. According to some researches of Dr. S. Weir Mitchell, the only ether present is nitrous ether, and this is devoid of power and in small quantity. As chloride of iron itself is diuretic, it is probably upon this that the diuresis produced by it depends. The dose of the chloride of iron (*Ferri Chloridum, U. S.*) is 1 to 3 grains. Tincture of the chloride of iron is considered a specific in *erysipelas* and should be given in very full dose and frequently repeated if it is to be of any service. Ten drops every hour is not too much. In *chronic Bright's Disease* it is of value and decreases the albuminuria. In *anæmia* it is useful, and owing to its acid is a doubly effective tonic. In cases of slight anæmia in which very great arterial pressure exists Dr. Mitchell uses a purely milk diet, and an ounce of an old tincture of iron in the twenty-four hours. While he recognizes the fact that iron preparations are generally supposed to raise blood-pressure, he asserts that in this instance the blood-pressure is lowered. *Liquor Ferri Perchloridi, B. P.*, and *Tinctura Ferri Perchloridi, B. P.*, are used internally in the dose of 10 to 30 minims.

As a local application tincture of the chloride of iron is useful in *diphtheria* and *membranous croup* and even in *tonsillitis*. In this last malady large doses of the tincture internally with counter-irritation over the neck is most useful. When used internally it should be well diluted and taken through a glass tube to protect the teeth. The strong solution of perchloride of iron (*Liquor Ferri Perchloridi Fortior, B. P.*) is a powerful styptic.

Sulphate of Iron.

Sulphate of iron (*Ferri Sulphas, U. S.* and *B. P.*) is used internally in the dose of 5 grains in pill form in *chronic diarrhœa*. Externally in a solution of the strength of 5 to 25 grains to the ounce it is used as an astringent lotion. Two other forms of the sulphate are also employed, namely, the dried (*Ferri Sulphas Exsiccatus, U. S.* and *B. P.*) and the precipitated (*Ferri Sulphas Præcipitatis, U. S.*) (*Ferri Sulphas Granulata, B. P.*), each of which is given in the dose of 3 grains.

Iodide of Iron.

The syrup of the iodide of iron (*Syrupus Ferri Iodidi, U. S.* and *B. P.*) is a transparent liquid of a sweet, iron-like taste. It should contain no free iodine, and if it strikes a blue color with starch should be discarded. It is largely used in anæmia associated with *scrofulosis* and *struma*, and is useful in the eczema of young children when this is dependent upon lack of vitality and anæmia. The dose to a child of two years is 2 to 3 drops well diluted, and to an adult 30 to 40 drops in water, to be taken through a glass tube to protect the teeth.

The saccharated iodide of iron (*Ferri Iodidum Saccharatum, U. S.*) is used in place of the syrup in the dose of 2 to 5 grains in pill (*Pilula Ferri Iodidi, U. S.* and *B. P.*), each contains $\frac{1}{6}$ of a grain of reduced iron and $\frac{1}{8}$ of a grain of iodine, and are given in the dose of 1 to 3 pills.

Carbonate of Iron.

The carbonate of iron (*Ferri Carbonas Saccharatus, U. S.* and *B. P.*) is very slightly astringent and may be used in pill form under the name of *Pilulæ Ferri Compositæ, U. S.*, or in Griffith's pills, which also contain myrrh. The dose is 3 grains, and they are largely used in amenorrhœa dependent upon anæmia. Under the name of *Mistura Ferri Composita, U. S.* and *B. P.*, we have a liquid preparation used for the same purposes as the pills in the dose of 1 to 2 tablespoonfuls. *Pilula Ferri Carbonatis, B. P.*, are given in the dose of 5 to 20 grains.

Monsel's Solution.

Monsel's Solution (*Liquor Ferri Subsulphatis, U. S.*), sometimes wrongly called the persulphate of iron, is one of the most powerful styptics or hæmostatics that we have. It is never to be employed where a hæmorrhage is to be attacked through the circulation, but only when the solution can come in direct contact with the bleeding spot. The objection to its use is the heavy, black, and dirty clot which it forms. In *hæmoptysis* Monsel's Solution should be used in fine spray consisting of from 10 to 60 drops to the ounce of distilled water. In *uterine hæmorrhage* from any cause the dilution may be half and half, or if the *hæmorrhage be from a polypus* or the cervix uteri the pure solution should be used, locally applied. In *nose-bleed* Monsel's Solution may be employed diluted one-half or pure, but it is disagreeable because of the hard, black clot which is formed and the disagreeable sensations produced in the nasal chambers. Plugging with pledgets of cotton is generally sufficiently efficacious.

In the *intestinal hemorrhage* during typhoid fever Monsel's Solution has been, but ought not to be, given, as it is decomposed in the stomach before it reaches the intestine.

Monsel's Salt (*Ferri Subsulphatis*) should be given in pills of 3 grains each, the pills being made hard enough to escape into the intestine before the stomach breaks them down. One, two, or three pills may be given and repeated in an hour. *Hœmatemesis* due to bleeding in the stomach should be treated by 3-drop doses of the solution in a little water.

In *tonsillitis* and *pharyngitis* a most efficient application is pure Monsel's Solution on a pledget of cotton or camels'-hair brush; or equal parts of the solution and glycerin may be used. The application is often as painful as it is efficient. In *diphtheria* this method of treatment is often of great service. The antidote to Monsel's Solution is common soap.

Hydrated Sesquioxide of Iron.

Hydrated Sesquioxide of Iron (*Ferri Oxidum Hydratum U. S.*) is the *antidote to arsenic*, and to be efficacious it must be freshly prepared. It is to be made by precipitating any liquid preparation of iron by the addition of an alkali such as ammonia, or the addition of magnesium. If ammonia is used, the precipitate has to be washed with water several times to get rid of the alkali, which will be too irritant to swallow if present. Magnesium is itself antidotal and should be preferred. The antidote should be given in excess and as much as a pint of the iron solution should be precipitated. The magnesium should be freely added, as too much of it cannot be given. The officinal antidote to arsenic is *Ferri Oxidum cum Magnesio, U. S.*

In the *Prussian Phamacopœia* this is known as the *Antidotum Arsenici.*

Dialyzed Iron.

Dialyzed Iron (*Ferri Dialyzatum*) is a very feeble preparation of iron, lacking in astringency, easily precipitated from the solution in which it occurs and largely used in *anamia* by some practitioners. The dose is 10 to 20 drops in water three times a day. Sometimes river water will precipitate it. Owing to its unstableness it may be used without any preparation as an antidote to arsenic. *Liquor Ferri Dialyzatus, B. P.*, is given in the dose of 10 to 30 minims.

Citrates of Iron.

The four citrates of iron are soluble in water and very useful for this reason. *Ferri Citras*, *U. S.*, and *Ferri et Ammonii Citras*, *U. S.* and *B. P.*, occur in garnet-red scales and are given in the dose of 5 grains. The solution of the citrate of iron (*Liquor Ferri Citratis*, *U. S.*) is given in the dose of 10 minims. The *Ferri et Quininæ Citras*, *U. S.* and *B. P.*, and the *Ferri et Strychninæ Citras*, *U. S.* and *B. P.*, are given in the dose of 5 to 15 grains and 1 to 3 grains respectively. The solution of iron and quinine (*Liquor Ferri et Quininæ Citratis U. S.*) is given in the dose of 8 to 15 minims.

The bitter wine of iron (*Vinum Ferri Amarum*, *U. S.*) is composed of the solution of the citrate of iron and quinine, sweet orange peel, syrup and stronger white wine, and is given in the dose of 1 to 2 fluidrachms.

Beside these citrates there are two tartrates—*Ferri et Ammonii Tartras*, *U. S.*, and *Ferri et Potassii Tartras*, *U. S.*; *Ferrum Tartaratum*, *B. P.*, both given in the dose of 5 grains. The lactate of iron (*Ferri Lactas*, *U. S.*) is soluble in forty-eight parts of water and given in the dose of 5 grains. Lactate of iron is one of the ingredients of *Syrupus Hypophosphitum cum Ferro*, *U. S.*, the dose of which is ½ to 1 fluidrachm.

Valerianate of Iron (*Ferri Valerianas*, *U. S.*) is sometimes useful in hysteria with anæmia, given in the dose of 1 grain or more.

Oxalate of iron (*Ferri Oxalas*, *U. S.*) is given in the dose of 2 to 3 grains.

Hydrated peroxide of iron (*Ferri Peroxidum Hydratum*, *B. P*) is used in the dose of 5 to 30 grains. From the last preparation iron plaster (*Emplastrum Ferri*, *B. P.*) is made. The plaster of iron officinal in the *U. S.* is prepared from the hydrated oxide of iron.

The following preparations of iron are also officinal: *Liquor Ferri Acetatis*, *U. S.*, dose 15 minims to 1 fluidrachm; *Liquor Ferri Acetatis Fortior*, *B. P.*, dose 1 to 8 minims; *Mistura Ferri et Ammonii Acetatis*, *U. S.*, dose ½ to 1 fluidounce.

Phosphates of Iron.

There are two phosphates of iron, *Ferri Phosphas*, *U. S.* and *B. P.*, and *Ferri Pyrophosphas*, *U. S* The first of these is insoluble and is rarely used. The second is quite soluble and useful in the dose of 2 to 5 grains. *Syrupus Ferri Phosphatis*, *B. P.*, is given in the dose of 1 fluidrachm. Phosphate of iron is one of the ingredients of the syrup of iron, quinine, and strychnine (*Syrupus Ferri, Quininæ et Strychninæ Phosphatum*, *U. S.*), given in the dose of 1 fluidrachm.

Ammonio-ferric Alum.

Ammonio-ferric Alum (*Ferri et Ammonii Sulphas, U. S.*) is often given in *atonic leucorrhœa* in the dose of 2 to 5 grains. It is quite astringent.

Arseniate of Iron.

Arseniate of iron (*Ferri Arsenias, B. P.*) is used in the dose of $\frac{1}{16}$ to $\frac{1}{12}$ grain in anæmic subjects with skin diseases.

Bromide of Iron.

Bromide of iron (*Ferri Bromidum*) is said by Da Costa to be useful in *anæmia* with *chorea* in the dose of 5 to 20 grains in syrup. In other nervous diseases accompanied by anæmia and insomnia the syrup of bromide of iron (*Syrupus Ferri Bromidi, U. S.*) is useful in the dose of $\frac{1}{2}$ to 1 fluidrachm.

Wine of Iron.

The Wine of Iron (*Vinum Ferri, B P.*) is useful in *anæmia*, both in children and adults, and may be accompanied with cod-liver oil. It is given in a dose of 1 to 2 fluidrachms or more.

Aromatic Mixture of Iron.

The Aromatic Mixture of Iron (*Mistura Ferri Aromatica, B.P.*) contains so little iron that it should not be administered in cases where a chalybeate influence is desired; it is, however, a useful tonic, given in the dose of 1 to 2 fluidounces.

Untoward Effects of Iron.—Iron is apt to cause gastric distress and frontal headache in persons who are susceptible to its use. Even one dose will cause this trouble in some persons. In many instances the frontal headache will be found to be due to the constipation brought on by the iron and will be relieved if mild laxatives or purges are used. Indeed, the state of the bowels should always be watched and laxatives given whenever constipation is present. In rheumatic and gouty persons frontal headaches are a common symptom under iron and purgatives will not generally give relief. Sometimes salts of iron cause vesical irritation and constant desire to urinate, while mucus in abnormal amount forms in the bladder. In children its use may result in nocturnal incontinence of urine.

Incompatibilities.—Iron should not be used with any vegetable astringent containing tannic or gallic acid as it will make an ink. Alkalies and their carbonates are also incompatible with iron, as is gum-arabic, with which it forms a dark, gummy mass or jelly.

IGNATIA.

Ignatia, U. S., or Ignatia bean, is the seed of the *Strychnos Ignatia.* It contains two alkaloids, strychnine and brucine, as does nux vomica.

Physiological Action.—Its physiological action is identical with that of strychnine or nux vomica.

Therapeutics.—(See Nux Vomica.) The abstract of ignatia (*Abstractum Ignatiæ, U. S.*) is given in the dose of 1 grain; the tincture (*Tinctura Ignatiæ, U. S.*) in the dose of 15 minims to ½ fluidrachm.

IODIDE OF AMMONIUM.

Ammonii Iodidum, U. S., is used in the same doses and for the same purposes as the iodide of potassium. It is preferred by some to the latter salt when the respiratory or digestive tracts are involved.

IODIDE OF POTASSIUM.

The physiological effects of iodide of potassium (*Potassii Iodidum, U. S.* and *B. P.*) are entirely comparable to those of iodine itself, but it is employed for somewhat different purposes, is less irritant, more readily given, and perhaps more readily absorbed.

Therapeutics.—The use of iodide of potassium may be divided into three great divisions, each of which is important. It is also employed for many conditions not included in these classes.

1. SYPHILIS.—The use of iodide of potassium in *syphilis* is recognized as a part of all treatment for its relief. Elsewhere Dr. Martin has, in his excellent article, treated of this question, and it is only necessary here to call attention to the fact that the drug is generally well borne in large amounts by advanced syphilitics, although this is not always the case. The term "therapeutic test" is applied by one eminent teacher to signify a state of the system produced by syphilis in which a diagnosis may be made, by the fact that large doses of the iodide are borne without inconvenience. As already intimated, this resistance does not always prove the presence of syphilis, nor does

its absence prove the absence of this disease. Persons having hereditary asthma, gout, rheumatism, or some similar diathetic disease, often resist the iodide, and some syphilitics are affected with "iodism" after very small doses. In treating syphilis the drug should be used in the dose of 10 grains three times a day, gradually increased a grain a day until symptoms of "iodism" occur.

The quantity borne often amounts to 60 or 90 grains a day. The best way to use it is to order for the patient a saturated solution of the iodide, which contains in each drop about 1 grain, and at the same time a bottle of the compound syrup of sarsaparilla. To a tablespoonful of this the patient is to add the iodide solution, beginning with 10 drops three times a day and increasing a drop every twenty-four hours.

The iodide acts more slowly as an anti-syphilitic than does mercury.

In *tertiary syphilis* the remedy is invaluable.

In *nervous syphilis*, be its manifestations what they may, iodide of potassium is the standard remedy, only being supplanted by mercury when it is necessary to resolve a growth whose existence is a daily menace to the patient's life.

2. METALLIC POISONING.—Owing to the fact that iodide of potassium forms double soluble salts with all the metals in the tissues in chronic poisoning, thereby aiding in their elimination, it should always be employed in chronic lead, zinc, arsenic, or mercurial poisoning.

3. ANTI-RHEUMATIC.—Iodide of potassium is best suited, not to the acute sthenic stages of *rheumatism* when the joints are very hot and painful, but to the secondary or subacute periods when the joints are large and the case "hangs on"—now better, now worse. It acts best, under these circumstances, if combined with wine of colchicum-root (see Rheumatism). It is also to be tried in *sciatica*, *lumbago*, and *rheumatic neuralgia*, and should be employed in *chronic pleurisy*, *pericarditis*, and *hydrocephalus*, to cause absorption of the fluids.

In *aneurism*, particularly that of the aorta, the drug does good, but its value rests largely upon the cause of the disease, which, if it is syphilis, yields much more rapidly to the drug than if it is not. The pain, swelling, and pulsation generally decrease.

In *asthma* iodide of potassium is valuable if it is of the bronchial type, but ought not to be employed if it is gastric. In *bronchitis* and *intestinal catarrh* where the state is semi-chronic, and not relieved by chloride of ammonium, iodide of potassium should be used. If the bronchitis is chronic and the secretion profuse (bronchorrhœa) iodide of potassium will make it worse. The dose for an adult in all these instances should be about 3 to 5 grains three times a day.

In *chronic nephritis* small doses (5 grains t. d.) are thought by some to check the disease, but it is to be remembered that the drug may produce poisoning if the kidneys do not eliminate it, so that, if times salts of iron cause vesical irritation and constant desire to urinate, while mucus in abnormal amount forms in the bladder. In children its use may result in nocturnal incontinence of urine.

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In *chronic nephritis* small doses (5 grains t. d.) are thought by some to check the disease, but it is to be remembered that the drug may produce poisoning if the kidneys do not eliminate it, so that, if used at all, it must be employed with great care. If the drug is well borne it will cause an extraordinary increase in urinary flow, and will relieve the dropsy which may be present very rapidly indeed.

In *bronchocele* iodide of potassium internally, and tincture of iodine externally is the best treatment we can use, and in acute coryza, or "cold in the head," 10 grains of the iodide taken at the beginning of the trouble will often abort the attack.

In *hepatic cirrhosis*, in the early stages, the iodide often does good, and in *arterio-sclerosis*, or *atheroma* of the bloodvessels, it is of great service according to many English, French, and American writers.

A very important use of iodide of potassium is in the removal of *enlargements of the cervical glands* and those occurring in other parts of the body. In *enlargements of the spleen*, malarial or otherwise, external paintings with iodine and the internal use of the iodide in small doses are of service. In the later stages of *pneumonia* the iodides are useful to aid in the absorption of any exudates, but they are contra-indicated in phthisis, except in the fibroid form and in some cases of the syphilitic variety, as they aid in the breaking down of the lung.

Untoward Effects.—In some persons, after the use of the iodide, coryza with a tearful condition of the eyes comes on, so that the edges of the lids become reddened and the nose runs constantly. This is followed, if the drug is pushed, by the more positive signs of "iodism" spoken of under Iodine.

In others acne breaks out on the face and disorders of digestion and gastric irritability come on. The acne can nearly always be prevented by employing arsenic at the same time with the iodide. In some cases petechial rashes break out on the legs, while in others great mental and physical depression appear, so that listlessness or melancholia may develop.

Sometimes the iodide of ammonium or iodide of sodium will be borne when the iodide of potassium will not.

If bullæ or blebs follow the use of iodides, or other rashes appear, it is said that atropine will afford relief.

Administration.—The iodide, owing to its exceedingly disagreeable taste, should be given with the compound syrup of sarsaparilla, extract of licorice, or in milk. Large amounts of these vehicles are to be used.

One of the best ways to take it is in capsule, but if this is done a drink of milk or water or other fluid should precede and follow it, in order to prevent the drug from coming in contact with the stomach in concentrated form. The preparations of the iodide of potassium are: (*Unguentum Potassii Iodidi, U. S.* and *B. P.*), and the liniment (*Linimentum Potassii Iodidi cum Sapone, B. P.*).

IODIDE OF SODIUM.

Sodii Iodidum, U. S. and *B. P.*, is used in the same doses and for the same purposes as the iodide of potassium.

IODINE.

Iodum, U. S. and *B. P.*, is a non-metallic element found largely in sea-weed and in mineral iodates and iodides. It is soluble in ether and alcohol, but slightly so in water, and possesses an acid burning taste and a neutral reaction.

Physiological Action.—The physiological action of iodine, so far as its alterative powers are concerned, is absolutely unknown. Applied to the skin it stains it yellow, brown, or black according to the freedom of its application, and it acts without pain if the skin is intact. If very large amounts are used it produces vesication. Upon mucous membranes it acts as a powerful irritant. Germain Sée believes it to be a stimulant to the nutritive processes of the body and to the circulatory system, and is certainly correct in regard to the first part of his belief.

ELIMINATION.—The drug escapes chiefly through the kidneys and through the skin, the salivary glands, and in the milk of nursing women.

Poisoning.—The symptoms of acute poisoning are those of acute gastro-enteritis with severe pain in the œsophagus, stomach, and abdomen, and is accompanied by violent vomiting and purging. An early symptom is the persistent, strong metallic taste in the mouth with markedly increased salivation. The pulse becomes rapid, running and feeble, the face deathly pale, total arrest of urinary secretion takes place through renal irritation, and death occurs by failure of respiration, which is accompanied by loss of all vital power.

If the poisoning is not severe enough to cause death at once a fatal result is often attained, by reason of a widespread fatty degeneration of the tissues.

The treatment consists in the use of large amounts of starch in any form as the antidote, the employment of emetics and the stomach-pump, the application of heat to the body and extremities, and, finally, the employment of hypodermic injections of alcohol, digitalis, ammonia, and atropine or strychnine.

Chronic Poisoning.—Under the name of "iodism" the profession recognizes a state of the body brought on by the prolonged and excessive use of iodine in some of its forms. The earliest signs of this state are shown by a peculiar metallic taste in the mouth, particularly before breakfast, slight tenderness of the teeth and gums, increase of salivary secretion, a little morning nausea and lack of appetite for breakfast, and perhaps some coryza or evidences of gastric irritation. Acne rosacea often comes on very early. If the drug is continued, all these symptoms become more marked and the coryza becomes intense. Headache under the frontal bone and sore-throat often appear, and the pustular and bleb-like changes in the skin go on to active suppuration. Sometimes large boils appear, or purpura hæmorrhagica comes on.

In other cases the nervous system chiefly suffers. Twitchings of the muscles, neuralgic pains in the trunk and extremities, and wasting of the testicles, mammæ, and all other tissues occur as the result of trophic disturbances. Anæmia amounting to an actual cachexia is commonly produced. Loss of vision and paralysis may ensue.

Therapeutics.—In all cases where the system is in a state of chronic perverted functional activity, as in those diseases associated with processes of nutrition and known as *scrofulosis*, iodine is of service. In *enlargement of the lymph glands* it is, in its various forms, one of the best remedies we possess, but it ought not to be employed in those cases where rapid changes are going on in the gland, such as the formation of pus, since under these circumstances it will increase the size of the slough. The drug ought never to be used in phthisis for these reasons, except in the exceedingly chronic form known as *fibroid phthisis*. When inhaled in fumes it may be of service as a stimulant to the mucous membranes, but is never of value in phthisis otherwise. In countries where exophthalmic goitre is very prevalent iodine ranks as a most efficient remedy. In *cystic enlargement of the thyroid gland* it is valueless, but in simple hypertrophy it is of great value.

In *chronic bone disease* iodine applied about the affected joint in the form of the ointment diluted one-half with lard, or the pure tincture, will be found of service, and if *anæmia* exists the syrup of the iodide of iron should be given internally.

The other uses of iodine externally are many and important. As a slow counter-irritant, devoid of pain, it is particularly useful in children, and may be employed in 1 to 3 coats, and no more.

The proper way of using the tincture is to give one good black coat at one sitting, and not to repeat it until the skin has desquamated and become well renewed. If iodine is applied soon after one good, effective coat it will cause agonizing burning pain, which nothing will relieve except the removal of the iodine by the use of cologne-water, alcohol, whiskey, or gin. The latter causes such an increase in the pain as to be almost useless after the skin is broken. The best solution for its removal is one of iodide of potassium, which should be followed by a poultice. A good rule to follow is never to cause pain by the use of iodine, as the drug acts equally well if applied in such a way as to avoid suffering.

Iodine in the form of the tincture is applied as a counter-irritant paint in *pleurisy*, both to abort an attack and aid in the absorption of the fluid after it is thrown out into the chest. In *harassing irritative cough* it may be painted over the supra-clavicular spaces, and will lessen the secretion in *chronic bronchitis* if used in this way. In *chronic rheumatism* of the joints and muscles it does good locally applied. Often in *synovitis* the local application of iodine causes increased swelling for some days. This should not cause alarm, for ultimately the swelling decreases very greatly, and these cases are generally the best from a prognostic point of view.

In the course of *phthisis* every now and then a "spot" in the chest will become "sore," probably due to a limited area of pleurisy, and tincture of iodine applied locally will give relief. In *lupus* the tincture may be painted around the edges of the growth, and even over its surface, with the object of retarding its spread. In *chilblains* the iodine ointment gives the greatest relief if diluted one-half with lard, and is probably the most efficacious measure at our disposal. In certain individuals who have "pains in the chest" iodine ointment may do good if applied over the spot. As has been pointed out by others, iodine does good if muscular tenderness is present, while it fails if *pleurodynia* or *intercostal neuralgia* is the cause of the suffering. The latter should be removed by the use of belladonna. In certain forms of skin diseases, such as *tinea tonsurans* and *circinata*, tincture of iodine applied with a camel's-hair brush may be used, even the entire scalp being covered. The better way is to apply it to different spots each day. Where *erysipelas* is present the tincture may be painted around the edges of the inflammation, in order to prevent its spread.

In old persons, or those in middle life, *retraction of the gums* from the teeth sometimes comes on, and Stillé recommends for this disorder the use, by means of a camel's-hair brush, of a watery solution of iodine of the strength of 1 grain to the ounce, to be followed at once by a thorough rinsing of the mouth with pure water. In *hydrocele* iodine in the form of the tincture is the best remedy for effecting a permanent cure that we have. The sac should first be emptied by the use of a trocar and canula and the iodine alone, or with glycerin, injected with a syringe, and then allowed to escape. As the pain is most atrocious, the patient should be put partly under the influence of ether.

In *white swellings* and *ovarian tumors* as much as 10 ounces of the tincture may be injected, but it is to be remembered that certain dangerous symptoms may arise, at least after its use in this way in the chest. These consist in epileptiform convulsions, coma or collapse.

In *empyema* a solution of iodine 6 grains, iodide of potassium 6 grains, and water 1 pint, may be used daily as an irrigating fluid with good results. The tincture of iodine may be used, according to Ringer, as an inhalation, with signal benefit in the four following instances :

1. In the chronic forms of phthisis (*fibroid lung*); when the expectoration is abundant, and when the cough is troublesome, its inhalation used both night and morning will generally lessen the expectoration and allay the cough.

2. In children six to ten years of age, who after meals, or independently of them, on exposure to cold, are seized with hoarseness, a hoarse, hollow cough, and some wheezing at the chest. This affection involves the larynx, trachea and larger bronchial tubes, often proves very obstinate, is apt to return, and to persist a considerable time.

3. In some epidemics of *diphtheria* the inhalation recommended by Dr. Waring-Curran is of value, and consists of 4 grains of iodine and 4 ounces of water. A teaspoonful of this should be added to boiling water, and kept hot by a spirit lamp, whilst the steam is inhaled. As the patient becomes accustomed to the iodine the quantity of the solution may be increased till half an ounce of it is used at each inhalation. It should be repeated many times a day, and each inhalation continued from 8 to 12 minutes.

4. Some persons suffer with *itching of the nose*, of the inner canthus of one or both eyes, *sneezing*, *running at the nose* of a watery fluid, weeping of the eyes, and *severe frontal headaches*, and these patients of various ages are greatly troubled, often for many years, with daily attacks lasting, it may be, several hours. Iodine inhaled often removes this affection at once, and when it succeeds partly it almost always lessens the headache and discharge from the nostrils. Its effect is most marked in respect to the itching.

Ringer generally adopts the following simple, handy, cleanly, and effectual plan of inhalation: Heat well a jug capable of holding about two pints, by rinsing with boiling water, then partly fill with boiling water into which pour 20 to 30 drops of the tincture of iodine, then direct the patient to put his face over the mouth of the jug and to breathe the iodized steam, covering the head to prevent the escape of the steam. This inhalation should be used night and morning for five minutes, or a little longer. Occasionally an excess of iodine will temporarily produce a sensation of soreness in the chest and throat, sometimes with redness of the conjunctiva, running from the nose, and pain in the head.

Administration.—Iodine is never used in solid form, and it has been taught that the tincture (*Tinctura Iodi, U. S.* and *B. P.*) should not be given internally, on the ground that it is precipitated in the stomach. Whether this be true or false it is a fact that the tincture has recently been largely used in the vomiting of pregnancy with very good results. The dose is 5 to 10 drops, well diluted. Under the name of Lugol's Solution (*Liquor Iodi Compositus, U. S.*) iodine is frequently used internally; the dose is 5 to 10 drops, in water. The *B. P.* preparations not officinal in the *U. S. P.* are the liniment (*Linimentum Iodi*), the solution (*Liquor Iodi*) and *Vapor Iodi*, which is prepared by adding 1 fluidrachm of iodine to 1 fluidounce of water, which is gently heated, and the rising vapor inhaled.

Unguentum Iodi, U. S. and *B. P.*, is used locally over enlarged glands. In the case of children or adults who have delicate skins the ointment should be diluted one-half with lard.

Iodine is contra-indicated in renal diseases, except in small doses, in the progress of acute inflammation, and wherever tissues are rapidly undergoing degenerative changes.

IODOFORM.

Iodoform (*Iodoformum, U. S.* and *B. P.*) occurs in small saffron-colored crystals which possess a powerful, characteristic, penetrating odor, and strong taste. It is soluble in alcohol, ether, chloroform, benzol, fixed and volatile oils, but is insoluble in water.

Physiological Action.—When iodoform is absorbed from the stomach, or the skin from surgical dressings, it induces a train of serious and curious symptoms. Within half an hour iodine appears in the urine, and the symptoms assert themselves in one or two ways. One set of symptoms resembles meningitis. The face is suffused, the pupils contracted, the respiration stertorous, and the pulse slow and full, or rapid. Delirium of the wildest character may ensue so that the patient tears everything within reach. In another class of cases the symptoms resemble those of cerebral congestion in the flushed face, contracted pupils, slow breathing, low muttering delirium or perfect vocal quiet. After death widespread fatty degeneration is found at the autopsy.

The resemblance of the symptoms to cerebral congestion or meningitis should not mislead the physician into the belief that any head injury is present when a limb has been dressed with iodoform after an accident.

Locally applied the drug possesses very distinct anæsthetic power.

Therapeutics.—Iodoform is used chiefly as a surgical dressing. It is antiseptic, but not germicidal. Germs may be found in powdered iodoform, and will even grow in it. It does good by absorbing the liquids of the wound, and thereby removing the nidus for germ growth; and when applied to large moist surfaces gives off free iodine and acts as a protective.

In *syphilitic sores* the following dressing will be found of great service: Iodoform, 20 grains; oil of eucalyptus, ½ fluidounce. In eczema, with tingling and itching, the following application will give relief (Ringer):

℞.—Iodoform.	gr. iv.
Oleum eucalypti	ʒj.
Unguentum petrolei	℥j.

M. S.—Apply locally.

Internally iodoform is used in *tertiary syphilis* in all its forms, in the dose of from 1 to 5 grains. Bartholow recommends it most highly in *catarrhal jaundice* and in the early stages of *hepatic cirrhosis;* indeed, he thinks its persistent use in small dose will cure this affection.

Used by means of a powder-blower it will often relieve the hoarseness and discomfort of *laryngeal phthisis*. Sometimes a spray may be used, which should consist of spirits of turpentine and sweet oil, half and half, containing 2 grains of iodoform to each ounce. This mixture may also be used in *bronchial catarrh* to lessen the cough and fetid discharge.

In *fissure of the anus* 5 grains of iodoform in the form of a suppository may be placed in the rectum, and then, after it has remained there a few minutes, defecation may be had without pain.

Administration.—The ointment (*Unguentum Iodoformi, U. S.* and *B. P.*) is useful when applied over fetid sores. The drug itself may be given in 1 to 5-grain doses three times a day. The suppositories (*Suppositoria Iodoformi*) are officinal in the *B. P.*; each one contains 3 grains of iodoform.

IODOL.

This is a dark, dirty yellowish-looking powder, soluble in alcohol, ether, and oils, but only slightly so in water. Its uses in medicine are identical with those of iodoform, but it possesses the advantage of being far more odorless.

In *tubercular laryngitis* the powder may be blown into the larynx without disagreeable results and with a favorable effect on the diseased process. Cerna has found it of very great service in *diabetes* when given internally, in the dose of from 2 to 6 grains three times a day.

IPECACUANHA.

Ipecacuanha, U. S. and *B. P.*, or ipecac of medicine is the root of *Cephælis Ipecacuanha* a small shrub of Brazil. It contains an alkaloid, emetine and ipecacuanhic acid.

Physiological Action.—Locally applied to mucous membranes ipecac acts as an irritant, and if applied long to the skin causes vesicles and irritation. Very minute doses have little noticeable effect, but large ones produce nausea, relaxation, vomiting, free secretion into the bronchial tubes, and a profuse flow of saliva. The emesis is due to the irritation of the stomach and to an effect upon the vomiting centre in the medulla.

If emetine is given in lethal dose death is due to failure of respiration.

Therapeutics.—Ipecac is used as an emetic where a fairly rapid action is required. It is particularly useful in cases where the stomach of a child is overloaded with food. In poisoning it is hardly active or rapid enough as an emetic and is not so good as mustard or sulphate of copper. In babies and young children an attack of *bronchitis* often causes digestive disorders, by reason of the mucus coughed up from the lung being at once swallowed instead of spit out of the mouth. In these cases the stomach may be relieved and the state of the lungs improved by the use of an emetic dose of syrup of ipecac. (Dose, 2 to 3 drachms.)

In obstinate *vomiting* small doses will act as a most successful cure, provided that the vomiting is due not to inflammation and excitement, but to depression. The irritant effect of the ipecac stimulates the depressed organ up to a normal tone.

In some cases of the *vomiting of pregnancy* it is very useful, in others it utterly fails. One drop of the wine or one or two grains of the powdered ipecac is all that should be used. In vomiting, with *flatulence*, either ipecac or nux vomica are of service. In the *morning vomiting of drunkards* ipecac is of service, but is not so good as small amounts of arsenic or hydrochloric acid.

In acute, true *dysentery* ipecac is the best remedy we possess. When the passages are large and bilious and the disease is malignant, as it occurs in the tropics, ipecac should be given in the following manner: The powdered ipecac should be given in the dose of 60 grains at once to produce vomiting. After vomiting has taken place small doses of 3 grains are to be given every hour and continued until a profuse black stool is passed. The passage of this stool is a most favorable prognostic sign, and its non-appearance is equally significant of harm.

In *choleraic diarrhœas* and *cholera morbus* ipecac is often of great service in the dose of 3 grains every two hours. No less a person than the great Trousseau asserted that ipecac was a *hæmostatic*, and it is said to be most effective in hæmoptysis in small doses.

As an *expectorant* ipecac is to be used in the early stages of *bronchitis*, to act as a sedative to the inflamed mucous membrane and promote secretion. Under these circumstances it is best combined with citrate of potassium (see Bronchitis). Ringer and Murrell have found that inhaling ipecac spray is very useful in *chronic winter cough* or *bronchitis*, particularly when there is shortness of breath present.

The pure wine may be used in a spray apparatus, or be diluted one-half with water. While the throat may seem temporarily worse the shortness of breath rapidly decreases, and a great improvement takes place in the cough. In order that the wine which collects in the mouth be not swallowed, the patient should be directed to rinse the mouth thoroughly every few minutes lest nausea and vomiting phate.) In *uræmic poisoning* pilocarpine is the most efficient and rapidly acting remedy that we have, and when used in *Bright's Disease* is of value in several ways; first, by removing the strain on the kidneys; second, by eliminating the uræmic poison; and third, by lowering the inflammatory action of the kidneys if they are acutely inflamed. The drug in small doses certainly increases renal activity. The dose should be about $\frac{1}{20}$ of a grain hypodermically as a renal stimulant. In some forms of *profuse sweating*, such as come on at night in general debility, pilocarpine, if given hypodermically about two hours before the sweat in the dose of $\frac{1}{20}$ of a grain, is often useful, even where atropine fails. Pilocarpine certainly has a decided effect in encouraging the growth of hair, and applied locally will often do good in partial *baldness*. If too much pilocarpine is used it is apt to cause the development of small pustules about the hair follicles. Bartholow recommends the following application for baldness:—

℞.—Extract. pilocarpi	f℥j.
Tincturæ cantharidis	f℥ss.
Linimentum saponis	f℥jss.

Antagonisms of Jaborandi.—Jaborandi is a physiological antidote to atropine, and to agaricin, four times as much pilocarpine must be used to equal a dose of atropine.

Administration.—The dose of jaborandi is 40 grains, used in the form of the powdered leaves in infusion. The fluid extract (*Extractum Pilocarpi Fluidum U. S.*) should be used in 30 drops to 1 drachm doses. Pilocarpine is far superior to jaborandi, in that it does not so often produce nausea and vomiting. It is used in the form of the hydrochlorate (*Pilocarpinæ Hydrochloras U. S.*) in the dose of from $\frac{1}{8}$ to $\frac{1}{3}$ of a grain hypodermically or $\frac{1}{3}$ to $\frac{1}{2}$ of a grain by the mouth.

The preparations of the *B. P.* are, the extract (*Extractum Jaborandi*), dose 2 to 10 grains; the infusion (*Infusum Jaborandi*), dose 1 to 2 fluidounces; the tincture (*Tinctura Jaborandi*), dose $\frac{1}{2}$ to 1 fluidounce; and the nitrate (*Pilocarpinæ Nitras*), dose $\frac{1}{20}$ to $\frac{1}{2}$ grain.

Clinical reports show that pilocarpine in small doses is a very good remedy in tobacco and alcoholic amblyopia, and Da Costa has recently highly recommended the hypodermic injection of pilocarpine around the border line of erysipelatous inflammations as a curative and preventive measure in the early stages.

JALAP.

Jalap (*Jalapa*, *U. S.* and *B. P.*) is the root of *Exogonium Purga*, is a native of Mexico. It contains two resins, Jalapin and Convolvulin, neither of which is used in medicine. In overdose it causes vomiting and purging, with gastro-enteritis.

Therapeutics.—Jalap is used in medicine as a hydragogue purge to relieve *dropsies* of any origin. It may be used to deplete in cases of *general plethora* with *cerebral congestion*, and owing to its tastelessness, is a useful cathartic in children if given in the proper dose, namely, 1 to 2 grains in half an ounce of syrup of rhubarb. Combined with calomel it is preferred to all other purges by some practitioners, particularly if the liver is torpid.

Administration.—Jalap may be given in powder (*Pulvis Jalapæ Compositus, U. S.* and *B. P.*), dose 15 to 40 grains; in the abstract (*Abstractum Jalapæ, U. S.*), dose 5 to 15 grains; and the resin (*Resina Jalapæ, U. S.* and *B. P.*), dose to an adult, 2 to 4 grains. Owing to the small size of the dose of the resin and its lack of taste, this is to be preferred for children in the dose of $\frac{1}{4}$ to $\frac{1}{2}$ a grain The tincture (*Tinctura Jalapæ, B. P.*) is given in the dose of $\frac{1}{2}$ to 2 fluidrachms; the extract (*Extractum Jalapæ, B. P.*) is used in the dose of 5 to 15 grains.

JUNIPER.

Juniperus, U. S., is the fruit or berry of *Juniperus Communis*, an evergreen of Northern Europe and America. It contains a volatile oil and an amorphous principle, juniperin.

Physiological Action.—Juniper acts as a gastric stimulant and tonic, as a mild diaphoretic if combined with alcohol, and as a marked stimulating, exciting diuretic. It escapes from the body by the kidneys.

Therapeutics.—Juniper is valuable as a stimulant to the genitourinary system wherever it is depressed or chronically diseased, as in *chronic pyelitis, nephritis*, and *chronic catarrh of the bladder*. In *congestion of the kidneys*, if not accompanied by active renal changes, it relieves these organs and does away with *albuminuria*. Used after an attack of *acute Bright's disease* when reaction has set in and the secreting epithelium of the kidney is atonic it is of value, but care should be taken that all inflammation has passed by or it will make matters worse. In the later stages of scarlet fever in which the renal condition corresponds to that just described, juniper is useful. In old persons a *sensation of weight across the lumbar region* is often readily removed by the use of juniper if the kidneys are inactive.

Administration.—Juniper is used in the form of the compound spirit (*Spiritus Juniperi Compositus, U. S.*), composed of the oils of juniper, caraway, and fennel, combined with alcohol and water, in the dose of 1 to 4 drachms. Gin is virtually identical with the compound spirit. The infusion of juniper is made by adding an ounce of the berries to a pint of boiling water and allowing it to stand in a warm place for an hour. The entire quantity is to be taken in twenty-four hours and is often combined with acetate of potassium or an ounce of the bitartrate of potassium in the treatment of dropsy. The spirit (*Spiritus Juniperi, U. S.* and *B. P.*) is given in the dose of 30 minims to 1 drachm. The oil (*Oleum Juniperi, U. S.* and *B. P.*) is used in the dose of 1 to 4 minims.

KAMALA.

Kamala, U. S. and *B. P.*, or Rottlera, as it is sometimes called, is the hairs and bristles from the capsules of *Rottlera Tinctoria*, a plant of Abyssinia, India, and China. It contains an active principle, rottlerin, which is not officinal. Given in the dose of 1 to 2 drachms it acts as a drastic and as a remedy for *tapeworm.* It should be administered in syrup, and repeated in eight hours if no effect is produced. (See Worms.)

KINO.

Kino is the inspissated juice of the *Pterocarpus Marsupium*, a tall tree of India. It contains kino-tannic acid and is used as an astringent in *serous diarrhœas.* It is officinal in the form of the tincture (*Tinctura Kino, U. S.* and *B. P.*) given in the dose of 1 fluidrachm. It may be used as a gargle in *sore throat* and *relaxed uvula.* Under the name of *compound powder of kino* (*Pulvis Kino Compositus, B. P.*) an efficient and pleasant *anti-diarrhœa* powder may be used. This powder is not officinal in the *U. S. P.* The formula consists of 15 grains of powdered kino, 4 of powdered cinnamon, and 1 of powdered opium in each powder.

KRAMERIA.

Krameria, U. S., Krameriæ Radix, B. P., is sometimes called Rhatany, is the root of *Krameria Triandra* and *Tomentosa*, shrubs of Peru and New Granada, and is employed in *serous diarrhœas* with good effect. The tincture (*Tinctura Krameriæ, U. S.* and *B. P.*) is given in the dose of 1 drachm, the solid extract (*Extractum Krameriæ, U. S.* and *B. P.*) 5 to 10 grains, the fluid extract (*Extractum Krameriæ Fluidum, U. S.*) dose 10 to 20 drops, and the syrup (*Syrupus Krameriæ, U. S.*) dose 1 ounce. The troches (*Trochisci Krameriæ, U. S.*) are held in the mouth for a local astringent effect. An infusion (*Infusum Krameriæ*) is officinal in the *B. P.*, dose 1 to 2 ounces.

LANOLIN.

Lanolin is a fat derived from the wool of the ordinary sheep and is supposed to possess very remarkable penetrating powers as an application to the skin in cases where much infiltration is present, particularly if combined with resorcin or some similar medicament. In itself it has little curative power, and is no better than lard, oil, or any common fat. In some cases, which are rare, it will cause irritation of the skin.

LEAD.

Plumbum or Lead is a metal possessing more or less power over the organism according to the salts employed. It is not officinal as lead itself.

Physiological Action.—Lead in one of its soluble salts, if applied to a mucous membrane, produces a bleaching which is particularly noticeable where the redness of inflammation has previously existed. It has little effect in single dose except by an indirect influence over the circulation, nervous system, or respiration. For the effects of overdoses see Poisoning by Lead, below.

The most irritant and poisonous salt is the nitrate, the next the subacetate, and the least poisonous of the soluble salts is the acetate.

Acute Poisoning.—When the acetate of lead is taken in poisonous amount it produces a sweet metallic taste in the mouth followed by pain in the epigastrium and the vomiting of white, milky-looking liquids or white curds mixed with food. The white color is due to the chloride of lead formed by the action of the gastric juice.

The pain continually increases, and diarrhœa due to gastro-enteritis may be set up, or, in other cases, obstinate constipation is present. The passages are generally *black*, this being due to the presence of the sulphide of lead. At the same time the pulse becomes rapid, tense, and cord-like, and after a time weak and relaxed. The face is anxious and pale, or livid. The thirst is excessive and cramps in the calves of the legs or muscular twitchings may ensue. It is said that the blue line on the gums may appear in acute poisoning, but this is not based on fact. If coma comes on, death is assured.

The treatment consists in the use of the chemical antidote, a soluble sulphate, in large quantity, and in the administration of emetics and the use of the stomach-pump if the vomiting produced by the drug is not sufficient to rid the stomach of all the poison. The best soluble sulphates to employ are Epsom and Glauber salts, because they are always at hand, are readily soluble, and, in excess, act as purges, which will wash out the intestinal canal. Hot applications should be applied and the pain and irritation relieved by opium.

Chronic Poisoning.—Chronic lead-poisoning is rarely produced by the soluble salts of lead, nearly always it is due to the insoluble salts. The symptoms of chronic lead-poisoning or plumbism are as various as it is possible to find variety in the signs of disease of every kind. There is no train of symptoms which may not occur, and the occurrence of rare, anomalous symptoms in a given case should at once bring to the mind the thought of lead-poisoning or syphilis. Chronic poisoning occurs in painters, manufacturers of lead salts, and every one who is largely thrown in contact with the metal. It is seen from the use of hair-dyes containing the acetate of lead, from drinking-water which has passed through new lead pipe, and even from the biting of threads loaded with lead to increase the weight. Chromate of lead has been used to color sponge cake, when eggs were thought too dear, and has killed many persons. Millers, who have filled the holes in grindstones with lead, have caused widespread epidemics, of what has been called "dry cholera," and many persons have suffered from lead-poisoning on eating apple-butter kept in jars glazed with lead.

The most prominent, but by no means the most constant symptom of chronic plumbism, is bilateral wrist-drop, due to palsy of the extensor muscles of the forearm. The short extensor of the thumb generally escapes the drug's influence. Sometimes internal squint arises from paralysis of the external rectus muscles. Another very common symptom is colic centering around the umbilicus and radiating through the belly and loins. Obstinate constipation often accompanies these symptoms, and the fæces, when passed, are white and clay colored.

During the attack of colic the arterial tension is increased very markedly, the tongue is coated and whitish, and the appetite is lost.

If these early warnings are disregarded and the exposure is continued, cerebral symptoms come on, known as *encephalopathia saturnina* or saturnine cerebritis. Saturnine epilepsy is not very rare. If convulsions come on death generally ensues. The convulsions in some cases are not due to a cerebral effect of the lead, but to uræmia from the renal changes present.

Renal disease is very commonly produced by lead, and it is not uncommon for chronic contracted kidney to be found at the autopsy. If a patient with chronic lead-poisoning have a urine with a persistent low specific gravity, the prognosis is grave as evidencing advanced kidney involvement.

Asthma, due to inhalation of lead-dust, is sometimes seen.

The most important confirmatory evidence of chronic lead-poisoning is a blue line on the gums just where they join the teeth. Its absence is not a negative sign, however, as persons cleanly in respect to their mouths often do not have it. Marked cachexia or anæmia is commonly seen.

After prolonged poisoning the nerve-trunks are found atrophied and finally changed into fibrous cords. Poliomyelitis, anterior or posterior, may be present, and locomotor ataxia is commonly caused. It is said that the locomotor ataxia of lead may be distinguished from the idiopathic form by the fact that in lead-poisoning the sphincters are affected while they escape in the non-toxic form.

In some cases trophic changes in the joints ensue, and plumbic gout is not rarely seen or even lead arthralgia with deposits in the joints.

Lead escapes from the body in the urine, the fæces, and all the secretions. It is chiefly eliminated by the liver and the bile.

TREATMENT OF CHRONIC POISONING.—The treatment consists in three classes of measures: 1st, the removal of the cause; 2d, the removal of the poison in the body; and, 3d, the treatment of the lesions produced.

In lead-colic hepatic purges, such as jalap and calomel, combined with opium to prevent pain, are indicated, and alum and opium, or morphine, are said to be almost specifics, the alum in two-grain doses; the others in full amounts.

In the cerebral inflammation of lead poisoning a blister to the back of the neck, revulsives, and a pilocarpine sweat may be resorted to.

To aid in the elimination of the lead iodide of potassium, which forms double soluble salts in the tissues with the drug, is to be used, 10 grains three times a day.

If progressive paralysis is present Wood insists on the use of large doses of strychnine at the same time that the iodide is given. The strychnine should not, of course, be given with the iodide, as it is incompatible.

Electricity should be used as a remedy to restore lost function. If the faradic current makes the muscles contract it should be employed, and, if not, the galvanic should be used. Curiously enough voluntary power sometimes returns before the muscles will react at all to electricity.

It is said that baths of sulphurets of potassium should be used; 5 or 6 ounces of the salt to each bath, which is to be given in a wooden tub. The patient should afterward be well soaped, then well rinsed off, and rubbed down with a rough towel.

As each salt of lead is used for different purposes the therapeutics of each one will be taken up separately.

Acetate of Lead.

Acetate of Lead (*Plumbi Acetas, U. S. and B. P.*), or sugar of lead, has a sweet, astringent taste, and is soluble in water, although the solution is slightly milky. The *B. P.* recognizes the following preparations of lead acetate (*Pilula Plumbi cum Opio*), dose 3 to 5 grains; *Suppositoria Plumbi Composita*, each suppository containing 1 grain of opium to 3 grains of lead acetate; and an ointment (*Unguentum Plumbi Acetatis*).

Therapeutics.—Acetate of lead may be used, and is largely employed in the following pill in *serous diarrhœa:*—

℞.—Plumbi acetat.	gr. xl.
Pulv. opii	gr. x.
Camphoræ	gr. xl.

M. ft. in every pill No. xx.—S. One every four hours.

This pill may be given in dysentery.

Liquor Plumbi Subacetatis.

Liquor Plumbi Subacetatis, *U. S.* and *B. P.*, or Goulard's extract is a colorless liquid, much used externally, when diluted, with laudanum, for *sprains*, *bruises*, and local inflammations, under the name of lead water and laudanum. The proportion should be 7 parts of the lead water, diluted with 14 parts of water, to 1 of laudanum, but this is varied as the inflammation or pain is more severe. The officinal liquor is also officinal in a dilute solution (*Liquor Plumbi Subacetatis Dilutus*, *U. S.* and *B. P.*), and, as such, is too weak for ordinary use, although it is commonly employed. The strong solution should be used in the strength of from 1 to 4 ounces to the pint of water. This solution should never be employed if the skin is broken, as absorption may occur, and what is more important still it prevents healing by constringing and whitening the edges of the wound. If some bread crumbs be saturated with this solution and applied to a finger it will abort a *felon* in the early stages. The officinal dilute solution is useful as a lotion in *eczema*, which itches and tingles, and is not dry. It should be applied once or twice a day, and it is well to follow it with a weak sulphur bath or alkaline wash. (See Eczema.)

This solution is also useful in *pruritus pudendi*, and the acetate of lead may be used as an injection in the dose of 1 to 8 grains to the ounce in *gonorrhœa*. The cerate (*Ceratum Plumbi Subacetatis*, *U. S.*), the liniment (*Linimentum Plumbi Subacetatis*, *U. S.*), and the glycerin (*Glycerinum Plumbi Subacetatis*, *B. P.*), may be used for the same purposes as the Goulard's extract.

Carbonate of Lead.

Carbonate of Lead (*Plumbi Carbonas*, *U. S.* and *B. P.*) is insoluble, and is used as a coating or dressing for *burns*, *scalds*, or *ulcers*, when rubbed up with linseed or other oil, or in the form of the ointment (*Unguentum Plumbi Carbonatis*, *U. S.* and *B. P.*). If a wide surface is exposed it may cause poisoning by absorption.

Nitrate of Lead.

Nitrate of Lead (*Plumbi Nitras*, *U. S.* and *B. P.*) is never used internally but as a powder around *onychia maligna*, and in Ledoyen's Disinfecting Solution. The latter discolors the paint in water-closets, and dissolves the solder in drain-pipes, and is not a good preparation for general use.

Litharge.

Litharge (*Plumbi Oxidum*, *U. S.* and *B. P.*) is used for the preparation of lead plaster (*Emplastrum Plumbi*, *U. S.* and *B. P.*), and this is in turn employed for the manufacture of resin plaster (*Emplastrum Resinæ*, *U. S.* and *B. P.*). It is also used in the preparation of the solution of subacetate of lead (*Liquor Plumbi Subacetatis*, *U. S.* and *B. P.*).

Hebra recommends for *sweating of the feet* an application of equal parts of lead-plaster and linseed oil, applied on linen, and wrapped around the feet every third day.

Iodide of Lead.

Iodide of Lead (*Plumbum Iodidum*, *U. S.* and *B. P.*) is occasionally employed in medicine; the dose is ½ to 3 grains. *Emplastrum Plumbi Iodidi*, *B. P.*, and *Unguentum Plumbi Iodidi*, *U. S.* and *B. P.*, are useful as external astringent applications.

LIPANIN.

Lipanin is an artificially prepared mixture devised by von Mering as a substitute for cod-liver oil, and consists in 6 parts of oleic acid to each 100 parts of olive oil. The advantages possessed by it are its lack of disagreeable odor and taste, and its ready emulsification and digestibility. The commencing dose is 1 drachm, and it may be increased to 4 drachms. This mixture has been found of value in most of the diseases in which cod-liver oil is employed, but in the opinion of the author its efficacy is greatly increased if the hypophosphites of lime and sodium are used at the same time in the dose of 10 grains each three times a day.

LIQUORICE.

Licorice (*Glycyrrhiza, U. S. P., Glycyrrhizæ Radix, B. P.*) is the root of *Glycyrrhiza Glabra* a plant of Southern Europe and Asia. It is used in the form of the solid extract to increase secretion in the mouth, and when dissolved in water to form a vehicle for other drugs, particularly if they have a disagreeable taste. The powdered solid extract is a very mild laxative and forms the bulk of the compound liquorice powder.

Administration.—The solid extract (*Extractum Glycyrrhizæ U. S.* and *B. P.*) is used in a dose anywhere from 5 to 120 grains. The pure extract (*Extractum Glycyrrhizæ Purum, U. S.*) is used in the same quantities as the ordinary extract. The fluid extract (*Extractum Glycyrrhizæ Fluidum, U. S.*) or the liquid extract (*Extractum Glycyrrhizæ Liquidum, B. P.*) is used in 1 to 2 drachm doses. Under the name of Brown mixture or "compound liquorice mixture," a very efficient expectorant mixture is officinal (*Mistura Glycyrrhizæ Composita, U. S.*) which contains as its most important ingredients 12 parts of paregoric, 6 parts of wine of antimony, and 3 parts of sweet spirit of nitre. The dose is 1 to 4 drachms. *Pulvis Glycyrrhiza Compositus* (*U. S.* and *B. P.*), or compound liquorice powder, contains, according to the *U. S. P.*, 18 parts of senna, 16 of liquorice, 8 of fennel, 8 of washed sulphur, and 50 parts of sugar. According to the *B. P.* it should contain 2 parts of senna, 2 parts of liquorice root, 1 part of fennel fruit, 1 part of sublimed sulphur, and sugar 6 parts. The Troches (*Trochisci Glycyrrhizæ et Opii, U. S.* and *B. P.*) contain $\frac{1}{20}$ grain of opium and 2 grains of extract of licorice. Finally we have *Glycyrrhizinum Ammoniatum, U. S.*, which is the sweet principle of liquorice rendered soluble and easily tasted by the addition of ammonia. The dose is 5 to 15 grains.

LITHIUM.

Lithium is used in several forms, but its salts may be divided into two classes—those which act as lithium and those which act as the acids forming them. In the first class we have the carbonate (*Lithii Carbonas, U. S.* and *B. P.*) dose 2 to 10 grains, and the citrate (*Lithii Citras, U. S.* and *B. P.*), dose 5 to 20 grains. In the second class we find the benzoate (*Lithii Benzoas, U. S.*), dose 5 to 30 grains; *Lithii Bromidum, U. S.*, dose 10 to 40 grains, and *Lithii Salicylas, U. S.*, dose 10 to 30 grains.

The carbonate and citrate are used in *gout* and *rheumatoid arthritis* for the purpose of entering into combination with the uric acid in the body to form soluble urates and prevent deposits in the joints. They have been said to dissolve *calculi*, but this is doubtful. They are very useful when it is desired to render the urine alkaline. The carbonate is not soluble in water and should be given in capsule or freshly-made pill, but the citrate is soluble. The latter may be made from the former by taking 50 grains of the carbonate, 90 grains of crystallized citric acid, and warm distilled water 1 fluidounce. The acid should be dissolved first and the carbonate added to the solution. The solution should then be kept hot until effervescence ceases.

In cases of *diabetes* depending upon a gouty taint remarkable results are often obtained from the use of the citrate or carbonate of lithium and arsenic. The dose should be $\frac{1}{30}$ of a grain of arsenite of sodium and 10 grains of the lithium salt three times a day.

For the use of the other salts see the articles on the bromides, salicylic acid and benzoic acid.

It is worthy of note that in some cases citrate of lithium will disorder the stomach and produce vomiting. Lithia water (*Liquor Lithiæ Effervescens, B. P.*) is useful in gout in quantities of 5 to 10 ounces at a time.

LIQUOR POTASSÆ.

Liquor Potassæ, U. S. and *B. P.*, is a solution of potassa containing about 5 per cent. of potassium hydrate, and is a clear, odorless liquid of caustic taste and strongly alkaline reaction. It is used in medicine as an *antacid* and for the purpose of decreasing *acidity of the urine.*

In *ingrowing toe-nail* it is often used to soften the nail, prior to packing with cotton or partial evulsion. Its dose is 5 to 30 drops well diluted in water.

LOBELIA.

Lobelia, U. S. and *B. P.*, is the leaves and tops of *Lobelia Inflata*, a common weed of the United States. It contains an alkaloid Lobeline and Lobelic Acid.

Physiological Action.—When taken in overdose lobelia causes emesis, intense prostration, a feeble pulse, pale skin, livid face, muscular relaxation and cold sweat. Violent purging may be present. It is said to paralyze the motor nerve-trunks, and it causes a fall of arterial pressure, followed by a rise due to the asphyxia which it finally produces. Ultimately it paralyzes the respiratory centre and the peripheral vagi. The treatment of the poisoning is to administer opium to stop irritation and vomiting, alcohol and ammonia to support the heart, and the use of external heat.

Therapeutics.—Lobelia is used chiefly as an *anti-asthmatic* and has been equally highly praised and condemned by eminent authorities. The reason for this lies in the fact that it is generally useless in *asthma* unless given in almost poisonous dose. Wood teaches that it should rarely if ever be used because of its poisonous effects in medicinally active doses, while Sidney Ringer says it is erroneously thought to be dangerous. In *asthma* both of the gastric and bronchial form it is undoubtedly of service. In some cases it certainly fails as signally as it ever succeeds. If the asthma is due to or associated with cardiac disease it should never be employed. The drug should be taken in the dose of ½ a drachm to 1 drachm of the tincture at the first sign of an attack, or in 10 drop doses every 15 minutes until distinct nausea occurs, or relief is obtained.

In *atonic constipation* 10 drops of the tincture at bed-time are often of service.

Administration.—Lobelia is given in the form of the tincture (*Tinctura Lobeliæ, U. S.*), in the dose of 30 drops to 2 drachms, according to the severity of action required. The vinegar (*Acetum Lobeliæ, U. S.*), in the dose of 20 to 30 drops, and the fluid extract (*Extractum Lobeliæ Fluidum, U. S.*), in the dose of 1 to 5 drops, and as an emetic in the dose of 15 drops.

In the form of the infusion, lobelia is useful as a lotion in poisoning by poison-ivy. The strength should be an ounce to the pint.

The preparations of the *B. P.* are, the *Tinctura Lobeliæ*, dose 10 minims to ½ drachm, and *Tinctura Lobeliæ Ætherea*, dose 10 to 30 minims.

LYCOPODIUM.

Lycopodium, U. S., is a pale yellow powder derived from *Lycopodium Clavatum*, a species of moss. It is used by pharmacists as a powder in which to roll pills, and by physicians and nurses to prevent the *intertrigo* or *chapping of the skin* of infants and adults.

MAGNESIUM.

Magnesium is a metal never used as such but always as one of its salts, which are the sulphate, citrate, carbonate and sulphite. The sulphate is a natural salt found in sea-water and in caves or in the water leaving these places. The others are derived from the sulphate. The carbonate is insoluble in water and alcohol. The others are soluble.

Therapeutics.—The carbonate is officinal in the form of the heavy and light powder (*Magnesia Ponderosa, U. S. and B. P.*), and (*Magnesia, U. S., Magnesia Levis, B. P.*). These two substances do not differ in respect to their effects. The light magnesium is never given internally because of its bulk, but it is used as a dusting powder in *intertrigo*, and in the form of white cubes rubbed on the skin to prevent excessive perspiration and as a cosmetic. The heavy magnesium is used as an *antacid* and is not in any sense a laxative, as it possesses no such power. When the stomach or intestines contain much acid from fermentative changes these acids may, however, unite with the magnesium and form a slightly laxative salt.

In *sick headaches* due to great *gastric acidity* it is often of service. The dose of the carbonate is from 5 to 60 grains. It should not be used constantly as it will accumulate in the intestines.

The troches (*Trochisci Magnesiæ, U. S.*) each contain 3 grains of light magnesium.

Magnesium Sulphate.

Sulphate of magnesium (*Magnesii Sulphas, U. S.* and *B. P*) is a white granular powder of neutral reaction, salty taste and is soluble in water. It is the form generally known by the laity as "salts" although in some parts this also includes the sulphate of sodium. According to the studies of Hay, and others, sulphate of magnesium is a purge by reason of its abstraction of water from the intestinal bloodvessels. All strong saline solutions above the strength of 7 per thousand abstract liquids from the tissues when brought in contact with them. On the other hand, if a saline solution be less strong than 7 per thousand it will abstract salts from the tissues and replace them with water. The recollection of these facts readily makes clear the use of magnesium sulphate. Whenever a thorough purgative action is required, that is, where depletion of the intestine or absorption of exudations is to be attained, the magnesium should be given in concentrated form, so as to make its solution of as high a percentage as possible.

In cases of *dropsy* this is particularly necessary, and from one to two ounces should be given before breakfast or on an empty stomach in as little water as will dissolve the salt. (See Dropsy.)

In *enteritis* and *peritonitis* this use of magnesium is widely recognized. The sulphate is not irritating and may be given freely where inflammation exists. (See Peritonitis.) It forms a large part of most purgative waters. The *B. P.* recognizes an enema, *Enema Magnesii Sulphatis*, composed of sulphate of magnesium 1 part, olive oil 1, and starch mucilage 15.

Magnesium Citrate.

The citrate of magnesium (*Magnesium Citras*) is a much more irritating purge than the sulphate but is more agreeable to the taste. It is officinal in two forms, one of which is the solution (*Liquor Magnesii Citratis, U. S.* and *B. P.*), which is effervescent and should never be used unless freshly prepared. It is made by adding bicarbonate of potassium to a syrupy solution of the citrate of magnesium, containing an excess of acid, and corking the bottle tightly, the cork being tied down with a strong cord; the bottle must be strong. The dose is half to one pint. It is too irritating to be used where inflammation of the alimentary canal exists, but is useful in sick and bilious headache.

The granulated citrate (*Magnesii Citras Granulatus, U. S.*) is solid and is less agreeable to take. It should be dissolved in water, about 1 to 3 drachms being used in each dose, and swallowed while effervescing. It must be kept in bottles tightly corked. Magnesium is an antidote to arsenic in itself, and when employed to precipitate a soluble preparation of iron it forms the *antidotum arsenici* (*Ferrum Oxidum Hydratum cum Magnesia, U. S.*). *Liquor Magnesii Carbonatis, B. P.*, is given in the dose of 1 to 2 ounces as a laxative. *Liquor Magnesii Citratis, B. P.*, is given in the dose, of 5 to 10 ounces.

MANGANESE.

Manganum or Manganese is officinal in the form of the black oxide (*Mangani Oxidum Nigrum, U. S.* and *B. P.*), and the sulphate (*Mangani Sulphas, U. S.*). The first of these, under the name binoxide of manganese, has been highly praised in *amenorrhœa* dependent upon functional disturbance and anæmia. The dose is 3 to 5 grains three times a day, in pill form. The sulphate is rarely if ever employed, but may be tried in *malarial jaundice*. The dose is 1 to 2 grains.

MANNA.

Manna, U. S. and *B. P.*, is the concrete juice of the exudation of *Fraxinus Ornus*, a tree of Europe. It occurs in small or large roundish masses, looking somewhat like a gray-colored gum arabic. It has a sweet taste and odor. Sometimes the taste is a little bitter.

Therapeutics.—Manna is the most feeble of the laxatives, and in some persons causes slight flatulence. In children fed by the bottle one of the most frequent disorders is *obstinate constipation*, and for its relief 1 to 2 drachms of manna may be dissolved in the milk of each bottle. When given to older children or adults it is always combined with other more powerful drugs, chiefly to cover their taste. It may be combined with advantage with rhubarb and senna and enters into the officinal *Infusum Sennæ Compositum*, *U. S.*

MATRICARIA.

Matricaria, *U. S.*, German Chamomile, consists in the flower heads of *Matricaria Chamomilla*, a European plant, possessing mild tonic properties in moderate dose. In larger amounts it acts as an *emetic* and *anthelmintic*. In the form of an infusion, of the strength of 1 to 2 ounces to the pint, it has been largely used as a diaphoretic and to prevent *colic* in teething children.

MERCURY.

Hydrargyrum, *U. S.* and *B. P.*, Mercury, or Quick Silver, is a heavy fluid metal of a peculiar color and appearance. As mercury it is used in medicine in the form of the ointment, the plaster, gray powder, and blue mass.

Physiological Action.—When mercury is taken into the body in one of its soluble and mild preparations, it may cause no evidence of its presence until by frequent dosage the system in general begins to feel its influence. The first evidences of this are seen in the mouth, and consist in tenderness of the teeth when the jaws are firmly and quickly closed, fœtid breath, sponginess of the gums, which finally may bleed at the slightest touch, swelling of the tongue, and, most prominent of all, excessive salivation, a condition sometimes called ptyalism. If the use of the drug is persisted in all these symptoms grow worse. Eczema, and finally sloughs of the chin and chest develop as the result of the constant dribbling of saliva and the direct depressing effect of the drug on the tissues. The teeth drop out, the maxillary bones undergo necrosis, and amid a general melting down and decomposition of the tissues the patient dies. The blood is affected and becomes very thin, fluid, and poor in its corpuscular elements. These symptoms ensue on the use of mercury in continued doses, and rarely follow exposure to the drug in the processes of the arts. In the arts, as in the making of looking-glasses, the workmen are often affected by various trains of symptoms varying very widely in their course. In some cases the nervous system becomes chiefly affected. Tremors of all sorts arise, paralysis agitans is developed in all its characteristics, and widely different changes and degenerations in the spinal cord ensue. Chorea often comes on, and its occurrence in an adult should cause inquiry as to any possible exposure to mercury. In other cases brownish discoloration of the skin, resembling Addison's disease, appears. Blindness, deafness, sensory disturbances, such as hyperæsthesia and anæsthesia, are developed, and localized wasting of muscles or group of muscles may assert themselves. In other cases still the blood becomes impoverished and mercurial cachexia is developed.

Mercury in all its forms is absorbed and eliminated by the kidneys, liver, sweat and saliva. No secretion of the body, even to the semen, fails to carry it out of the system, but it is to be remembered that, although all these parts are actively engaged in its elimination, the drug nevertheless rapidly accumulates in the body.

The question as to the manner in which the mercury finds entrance into the body is one of interest and importance. According to certain writers, it is changed into an albuminate and so circulates in the blood, and while this is probably true it is not known as a fact.

Balzer and Klumpke have made a long series of observations at the Lourcine Hospital, in Paris, on the rapidity of the elimination of mercury by the kidneys during a treatment of long standing. It is generally supposed that the bichloride is held in solution as an albuminate of the oxide of mercury united with sodium chloride, but others have asserted that metallic mercury in a state of minute subdivision circulates in the blood; this point, however, cannot be considered settled, and the drug undoubtedly accumulates in all the tissues, more especially in the liver and kidneys. It is also well known that it is eliminated by almost all the secretions, notably the milk.

While there are many methods for the estimation of mercury in organic fluids, these investigators throughout adopted that of Witz, as modified by Souchow and Michaelowsky, which permits of the easy detection of a $\frac{1}{1000}$ of a grain in an ounce. After a single dose of mercury the elimination of the drug is rapid and sometimes complete in twenty-four hours, but if a continuous treatment is interrupted its excretion continues for some time, and Kussmaul and Gorup-Besanez have found it in the liver as much as a year after its administration has been stopped. The amount of mercury that can be steadily eliminated for many weeks from the kidneys when the body is saturated is about $\frac{1}{16}$ of a grain a day.

The practical conclusion to be drawn from these researches is that it is well to stop the administration of mercury when the amount eliminated by the urine has reached its normal maximum.

Therapeutics.—The employment of mercury in medicine centres around four great points, viz.: 1st, its value in *syphilis* and kindred states; 2d, its use as a *purge;* 3d, its power as an *antiseptic and germicide;* and 4th, its action as an *antiphlogistic;* the first and fourth points are fulfilled by all the mercury salts more or less perfectly, the second only by blue mass and calomel, the third by the bichloride and biniodide of mercury.

In *syphilis* mercury is to be given not because the patient shows symptoms of the secondary or tertiary type of the disease, but because the conditions present do or do not call for its employment. Many writers have insisted that it ought only to be employed in the secondary stages, and while this is as a general rule correct, certain conditions may call for it at any time. (See Syphilis.)

The employment of mercury as a purge or laxative having special action on the liver is constantly resorted to. The two preparations used are blue mass and calomel, but the latter is more active. They both cause soft or watery stools according to the dose in which they are given, but the blue mass rarely, if ever, is used, except for a laxative effect.

Much discussion has arisen as to whether mercury does affect the liver, and whether the peculiar greenish or brownish yellow stools produced by it are due to the presence of bile or mercury.

The experiments of Rutherford, Prevost and Binet, and others upon the lower animals seem to prove that in these instances, at least, mercury does not increase the biliary flow; but on the other hand it is undoubtedly a fact that in man, even so small a dose as $\frac{1}{20}$ of a grain of calomel, may produce a bilious-looking passage and yet it is evident that there cannot be enough mercury present to color a large passage green or yellow. Again, analysis of the stools often fails to find any mercury unless the doses be large. Further than this we know clinically that when the stools are clay-like and lacking in biliary coloring matter mercury will restore the normal state. The conclusion must be reached that, be the results in animals what they may, in man, at least, the drug does increase biliary secretion and flow.

The preparations just named are largely used in the condition known as *biliousness*, and undoubtedly give relief. (See Biliousness.) If the tongue is heavily coated, the breath foul, the conjunctiva a little icteroid and headache is present, the drug should be employed. In *remittent malarial* fever the use of small repeated doses of calomel will often bring relief from the vomiting, and this drug should always be given in malarial disease before quinine is used, if a thorough action of the antiperiodic is required.

The disinfectant and germicidal power of bichloride of mercury and of the biniodide are very well established by clinical experience and experimental investigation. The strength of the bichloride in solution for antiseptic purposes may vary from 1 to 2,000 to 1 to 20,000 of water and for disinfectant use from 1 to 500 to 1 to 1000. (See Antiseptics.)

In using the bichloride it is necessary to add a few grains of tartaric acid to the solution to prevent its uniting with the albumen of the tissues to form an insoluble and useless albuminate. The same is true of the mercury biniodide.

The antiphlogistic or anti-inflammatory action of mercury is very marked indeed, but its employment is absolutely limited under these circumstances to one variety of inflammation, namely, the sthenic or dynamic form. In inflammation arising during the course of some exhausting disease, mercury is not only contra-indicated but harmful, thus: If a man in health is stricken with *pleurisy* or *peritonitis* or *meningitis* or any acute inflammation of a serous membrane be the cause what it may, the exudate poured out will probably be fibrinous, and capable of undergoing organization, thereby causing adhesions of the pleural surfaces, of the intestines or of the meninges of the brain. On the other hand, if a man be taken with pleurisy or meningitis during the course of phthisis or typhoid fever the exudate will be serous and large in quantity.

It is in the first case that mercury should be used to prevent the fibrinous exudate or to make it serous. In the second instance it will do harm by increasing the exudation. When given as an antiphlogistic the drug is often combined with opium to relieve the pain and irritation and to prevent purging. In *meningitis* arising from head injuries this treatment is the routine method and may be carried out by the use of powders containing ¼ grain of calomel and ¼ grain of powdered opium every hour till 1 or 1½ grains of each are taken. The simultaneous use of the ice-bag to the head and perfect quiet will often bring relief very rapidly.

Mercury is also the best remedy in *sthenic endocarditis* and should be given in full dose.

The bichloride may be used in small doses in place of the calomel, and does not of course produce the same tendency to laxity of the bowels. At the same time it often seems to be less efficacious.

Mercury in *myocarditis* and *pericarditis* is also of service and is thought by some to possess distinct prophylactic power in the early stages of *diphtheria* and *membranous croup.*

Leaving the general subject of mercury we may now consider each individual preparation.

Blue Mass.

Blue Mass (*Massa Hydrargyri, U. S.*) (*Pilula Hydrargyri, B. P.*) is made by rubbing up metallic mercury with liquorice and other excipients and is often called Blue Pill. Each grain of the mass contains ⅓ grain of mercury and it may be given in the dose of from ½ to 20 grains, for the same laxative purposes that we use calomel. Blue Mass is rarely used to produce systemic effects.

Mercury Ointment.

The ointment of mercury, mercurial ointment (*Unguentum Hydrargyri, U. S.* and *B. P.*), sometimes called blue ointment, is made by rubbing up mercury with suet and lard until it is extinguished, or, in other words, until the globules of mercury cannot be seen with a magnifying power of 10 diameters.

The ointment of mercury is used externally in certain skin affections, and for the purpose of influencing the general system in cases where the drug cannot well be taken by the mouth. In *syphilis* where a mercurial effect is to be reached, the ointment in small amounts should be thoroughly rubbed into the skin in various parts of the body, one evening in the left groin, the next in the right groin, the next evening in the left axilla and the fourth evening in the right axilla, beginning on the fifth evening in the left groin once more. This avoids local irritation of the skin; places the drug on spots where it is readily absorbed, and very rapidly influences the system of the patient. In *infantile syphilis* this method may be employed, or a flannel binder covered with the ointment may be placed about the belly. The clothes should not be changed too frequently as their saturation aids in producing the impression upon the system, and the wearing of an undershirt saturated after a few days' wear from the inunctions, is a very valuable though somewhat dirty method of producing mercurialization. The ointment of mercury is sometimes rubbed into the skin over enlarged glands. Under the name of the oleate of mercury (*Oleatum Hydrargyri, U. S.* and *B. P.*) a very efficient and more agreeable application than the ointment is used in the same manner.

In *pediculus pubis* or in any case where parasites, such as the flea or louse, infest the region of the genitals, or any hairy growth, mercurial ointment may be used as a cure owing to its lethal influence over these troublesome pests. Care should be taken that it does not cause salivation of the patient and it must not be allowed to remain on the parts but wiped off in the course of an hour or two or less. The following words from the pen of Dr. Joseph Leidy are sufficiently interesting to demand a place at this juncture: "We may here say that if it is once understood that all insects, including lice, are destroyed quickly by the application of any fixed or volatile oil, physicians will see there is no necessity of employing remedies of a noxious character to the patient. The fat of mercurial ointment is probably more quickly active than the mercurial oxide."

Mercury with Chalk.

Mercury with chalk (*Hydrargyrum cum Creta, U. S.* and *B. P.*) or gray powder is slightly purgative but is chiefly employed in the treatment of *infantile syphilis*, as it will not freely purge. The dose is 1 to 10 grains. In syphilitic marasmus children seem fairly to fatten on it.

Calomel.

Calomel (*Hydrargyri Chloridum Mite, U. S., Hydrargyri Subchloridum, B. P.*), or the mild chloride of mercury, is an insoluble salt which is nevertheless freely absorbed. Some have taught that it enters into the body as a bichloride being so changed in the stomach, but practically this does not occur. Calomel on passing into the intestines is changed by the alkaline juices there present into the black or gray oxide of mercury.

Calomel when used as a laxative purge should be given in the dose of ⅙ to ½ of a grain every half hour or every fifteen minutes until 1 or 2 grains are taken, as it will act as efficiently in this way as if 10 grains are given at one dose, and there is no danger of producing ptyalism. The reason that small doses are as efficient as large ones lies in the fact, that only the calomel which is precipitated into the gray oxide is active, and as the amount of alkaline juice in the intestine is small, only a minor part of a large dose of calomel acts, the major portion escaping unchanged. This is the reason that bicarbonate of sodium is added to calomel powders, to aid the intestinal juice in the reduction of the salt. If purgation does not occur, a saline purge should be given at the end of twenty-four hours, and this must always be used if large doses are employed.

Mercury in the form of calomel is very largely used hypodermically held in solution by a mucilage, or better still by fluid cosmoline. It should be injected deeply into the tissues, not immediately under the skin, the greatest cleanliness being necessary to avoid abscesses. The best place for these injections is in the fold of the buttocks but sloughing, tetanus, and even gangrene, has followed its employment in this way. (See Salicylate of Mercury.)

In *dysentery* of the acute form calomel and ipecac are the two best remedies (See Dysentery and Ipecac). It should be given in small doses repeated every hour or half hour until some effect in the number and character of the stools appears.

In children who seem constantly "under the weather" and never quite well, who have *flatulence, fœtid breath* and *ill-smelling, pasty stools* calomel often gives great relief in the dose of $\frac{1}{20}$ of a grain every half hour until four doses are taken, this treatment being pursued every fourth or fifth morning.

In *jaundice* due to exposure to cold and slight hepatic congestion ⅛ of a grain of calomel every half hour till ½ a grain is taken will often bring relief.

Calomel is generally prescribed in conjunction with sugar of milk, white sugar or bicarbonate of sodium, which are added to increase the bulk and wieldiness of the powder, and in the case of the latter ingredient, to increase its activity. Owing to its lack of taste, calomel is often placed on the tongue of children, but in this instance the white sugar is to be used, in small quantity, as the other vehicles are less agreeable.

A very important use of calomel and one which has been brought forward very recently as new, but which is many years old, is its employment in *dropsy* as a diuretic either alone or combined with squills or digitalis, or opium to prevent purging. The dose should be small, about 1 grain thrice a day, and if a diuretic influence does not assert itself in twenty-four hours it should be stopped. Still another use of calomel is in *typhoid fever* in which disease it has been highly recommended in small repeated doses, particularly if constipation is present. In the opinion of the author this is disadvantageous as a routine measure and entirely uncalled for.

Sidney Ringer has called attention to the fact that in constipation or in "biliousness" podophyllin does more good than calomel provided that the stools are dark in color, whereas if the same signs are present but the stools light and clayey in color calomel is more efficient. The author has proved the correctness of this assertion so frequently that he is convinced of its truth.

Calomel has been recommended in the condition of *anorexia* and depression following acute diseases, and when the tongue is covered by a thick yellow coat it is the remedy for the gastro-intestinal torpor always present. While purgative doses of calomel certainly are of value, the use of dark red freshly prepared nitro-muriatic acid is, however, highly preferable in many such instances to the mercurial salt.

Calomel is often given in small doses to "settle the stomach." Sometimes it will act in this way, but in other cases it will seem to increase the nausea and bring on vomiting. This is true of both adults and children, and it is impossible to tell beforehand which will occur. In a peculiar form of vomiting occurring in very young children, which comes on immediately after the food is swallowed, the rejection of milk being forcible and perhaps so sudden that it is not even curdled, and which is not accompanied by much straining, calomel will often give relief when all other remedies fail. It should not be resorted to until some evidences of wasting occur, as this action of the stomach in many children only rids it of part of the milk which is in excess, and is a purely physiological regurgitation. The calomel may be given in the dose of $\frac{1}{12}$ of a grain every hour, or if preferred gray powder in the dose of $\frac{1}{3}$ of a grain every hour is equally efficient in these cases.

Calomel will often remove *syphilitic condylomata* if dusted over them for some time, and an ointment made of one drachm of calomel to one ounce of lard is very useful in pruritus.

Calomel ointment (*Unguentum Hydrargyri Subchloridi, B. P.*) is often useful in the treatment of small patches of eczema.

Bichloride of Mercury.

The Bichloride of Mercury, or corrosive sublimate (*Hydrargyrum Chloridum Corrosivum, U. S., Hydrargyri Perchloridum, B. P.*) as it is called, is an exceedingly poisonous and irritating substance when in concentrated form.

Taken internally it causes violent pain in the stomach, vomiting, purging of mucus, blood and the contents of the intestine, collapse, syncope, and death. If taken in poisonous amount the patient should be made to swallow large amounts of the antidote, white of egg, the stomach should be washed out by the stomach-pump, heat should be employed about the body, and the proper stimulants be given if the pulse or respiration fail. If death does not occur at once the patient has a protracted convalescence or else dies from the organic changes produced in the gastro-intestinal tract, such as strictures, sloughs, destruction of the peptic glands and ulcerations.

Mercury bichloride, aside from its antiseptic use (see Antiseptics), is of great value when given internally, not only in syphilis, but in other states not associated with any such depraved condition. In *diphtheria* it may be used to prevent fibrinous exudation as readily as calomel, and in tonsillitis, where the inflammation is severe, it is often used with great service.

When using a solution of bichloride of mercury as an antiseptic tartaric acid should be added to the solution to prevent the precipitation of the mercury in the form of an albuminate.

In small amounts, that is $\frac{1}{60}$ to $\frac{1}{40}$ of a grain three times a day, the bichloride is one of the best remedies which we possess for the treatment of *anæmia*, be its cause what it may.

Bichloride of mercury is of value in minute does of $\frac{1}{50}$ to $\frac{1}{60}$ of a grain in the ill-smelling green stools of *summer diarrhœas* in adults and children, and it has been recommended that a solution be made $\frac{1}{2}$ a grain in 5 ounces of water and a teaspoonful be given every hour until relief is obtained. This treatment is particularly useful in *mucous diarrhœa,* in which blood and mucus are thoroughly mixed. Patients in the dispensaries often speak of these passages as containing "corruption," and others think them "lumps of flesh," owing to the masses of blood and mucus. Whether the disease be acute or chronic, the bichloride, used in the way just described, will be of service. In *dysentery* and the *diarrhœa* of adults the same treatment may be resorted to, using two teaspoonfuls of the solution instead of one. It is hardly necessary to add that the greatest care must be bestowed upon the diet and clothing. The author has treated a child with persistent diarrhœa for months with varying success, only to succeed when it was found that the abdomen was exposed to the air, and the mother was forced to apply and keep on the child a flannel binder.

In some cases in which an *obstinate syphiloderm* is present, half an ounce of corrosive sublimate and one ounce of chloride of ammonium may be added to a warm bath.

Half a grain of the bichloride of mercury in six ounces of water is said to be most efficient as an injection in *gleet*, if used every three or four hours.

In all *parasitic affections of the skin* a solution of 2 grains ot bichloride to the ounce of water may be sopped on the part three times a day. A solution of perchloride of mercury (*Liquor Hydrargyri Perchloridi*) is officinal in the *B. P.*; it is prepared by adding ½ grain of the perchloride of mercury to 1 ounce of water, with ½ grain of ammonium chloride to hold it in solution.

Biniodide of Mercury.

Mercury Biniodide (*Hydrargyri Iodidum Rubrum, U. S.* and *B. P.*) is a bright red powder, possessing irritating powers equal to or above those of the bichloride, and causing symptoms when taken in overdose closely resembling those produced by the latter drug. Owing to the formation of the salt it is thought to be particularly useful in the latter stages of *syphilis*. The dose is 1/30 to 1/15 of a grain. (See Syphilis.), An ointment (*Unguentum Hydrargyri Iodidi Rubri, B. P.*) is useful as an application in *goitre* and *obstinate skin diseases*.

At one time it was thought that biniodide of mercury was a better antiseptic than the bichloride, but this is not a fact.

Protiodide of Mercury.

Mercury Protiodide (*Hydrargyri Iodidum Viride U. S.*) is much more mild than the biniodide and is given for exactly the same purposes. The dose is 1/6 to ¼ of a grain three times a day.

Oxides of Mercury.

The yellow and red Oxide of Mercury (*Hydrargyri Oxidum Flavum, U. S.* and *B. P.* and *Hydrargyri Oxidum Rubrum, U. S.* and *B. P.*), red precipitate, are used largely as a dressing for syphilitic sores when diluted about one-half with chalk or other powder. If used pure they are somewhat caustic. From the yellow oxide is made the Oleate of Mercury (*Oleatum Hydrargyri, U. S.* and *B. P.*), which is used for the same purpose as ordinary mercurial ointment.

In *intestinal* and *gastric indigestion*, with foul belching and very ill-smelling stools which are due to intestinal sepsis, the yellow oxide is sometimes given in the dose of $\frac{1}{60}$ to $\frac{1}{50}$ of a grain in trituration. Mercurial suppositories (*Suppositoria Hydrargyri, B. P.*) are used when a mercurial effect is desired without the danger of interfering with the digestion.

Red Precipitate Ointment (*Unguentum Hydrargyri Oxidi Rubri, U. S.* and *B. P.*) and the Ointment of the Yellow Oxide (*Unguentum Hydrarygri Oxidi Flavi, U. S.*) are largely used, diluted one-half with lard in *chronic, scaly skin affections*, in *obstinate conjunctivitis* and in *granular lids.*

Ammoniated Mercury.

White Precipitate or ammoniated mercury (*Hydrargyri Ammoniatum, U. S.* and *B. P.*) is used in an ointment (*Unguentum Hydrargyri Ammoniati, U. S.* and *B. P.*) in various skin affections, generally diluted with lard.

In *ozœna*, whether syphilitic or not, Trosseau has recommended the employment of the following powder as a snuff:

℞.—Hydrarg. ammoniati . . . . gr. iv.
Pulv. sac. alb. . . . . ℥ss.
M.—S. To be used as a snuff, after thoroughly blowing the nose.

The Red Precipitate may be used instead of the white precipitate. This treatment removes the stench and may cure the complaint. It may, however, irritate the mucous membrane, in which case it should be used in the strength of 2 grains to the ½ ounce.

Black Wash.

Black wash (*Lotio Hydrargyri Nigra, B. P.*) is made by adding 1 drachm of calomel to a pint of lime water. It is used for washing *syphilitic sores* and *wounds.*

Yellow Wash.

Yellow wash (*Lotio Hydrargyri Flava, B. P.*) is made by adding 30 grains of corrosive sublimate to a pint of lime water, and is used for the same purposes as the black wash, but is much more stimulating.

Acid Nitrate of Mercury.

The solution of mercuric nitrate (*Liquor Hydrargyri Nitratis*, *U. S.* and *B. P.*), acid nitrate of mercury, is an exceedingly active, penetrating caustic, so rapid in its effects that it seems to drop through the tissues. It may be employed on *epitheliomata* and *large warts* applied by means of a glass rod. This treatment may also be resorted to with advantage in lupus until the surface of the growth is level with the skin. The surrounding parts should be protected by lard or oil.

As this treatment is very painful, the spot should afterward be covered with collodion.

Citrine ointment (*Unguentum Hydrargyri Nitratis*, *U. S.* and *B. P.*) is used in *chronic skin diseases* of the scalp and trunk. It is too strong for ordinary use and should be diluted one-half or less with lard according to the stimulating effect required; the dilute ointment is officinal in the *B. P.* as *Unguentum Hydrargyri Nitratis Dilutum*.

Linimentum Hydrargyri, *B. P.*, and *Emplastrum Hydrarygri*, *U. S.* and *B. P.*, are used for the same purposes as is the ointment of mercury.

Yellow Sulphate of Mercury.

Hydrargyri Subsulphas Flavus, *U. S.*, has been used under the name of Turpeth Mineral as an errhine in chronic ophthalmia, and also as a prompt emetic in croup. It is quick and certain, and, it is claimed, does not produce depression. The dose for a two year old child is 2 to 5 grains repeated in 15 minutes if necessary.

Incompatibles.—Bichloride of mercury should never be given with any other substance except chloride of ammonium, as it is incompatible with almost every other drug. With the iodide of potassium it may be used because the precipitate formed is at once re-dissolved, and the resulting mixture is highly alterative.

Calomel should never be given with iodides or bromides, and hydrochloric acid may convert it into the bichloride if it is present in any amount.

One of the best ways to use mercury is in the form of triturates which may be used by triturating 10 parts of the drug with 90 parts of milk sugar. The minute subdivision of the medicament aids in its efficiency because of its more ready absorption.

METHYL CHLORIDE.

Methyl Chloride is a colorless, easily liquefied gas with an odor resembling that of ether and chloroform, used to produce local anæsthesia. It is usually kept in a siphon or in an ordinary bottle and applied to the skin in a spray, or better still, by means of a cotton tampon saturated with the liquid.

Under these circumstance in a few minutes the skin becomes pale, afterward perfectly white and parchment-like looking. Local anæsthesia is now complete and minor surgical operations, such as opening boils or abscesses, can be accomplished without pain.

MEZEREUM.

Mezereum, U. S., Mezerei Cortex, B. P., is the bark of *Daphne Mezereum*, a plant of Asia, Europe, and Great Britain. It is supposed by some to be possessed of extraordinary alterative power, but this is certainly a mistake, as its influence in this line is very feeble. It is, however, distinctly irritant, and in overdose causes all the symptoms of gastro-enteritis. It is so irritant as to have been used externally as a counter-irritant. It enters into the compound syrup, fluid extract, and decoction of sarsaparilla, but is rarely, if ever, given alone. The officinal preparations of mezereum are the extract (*Extractum Mezerei, U. S.*), the fluid extract (*Extractum Mezerei Fluidum, U. S.*), and the ethereal extract (*Extractum Mezerei Æthereum, B. P.*), all of which are used as external irritants.

MUSK.

Musk (*Moschus, U. S.* and *B. P.*) is obtained from the preputial follicles of the musk deer of Thibet, and is a substance possessing the most remarkable penetrating powers, so far as odor is concerned. Very little of the musk for sale in the shops is pure, and most of it has never seen musk. Its price varies very greatly, but if sold for less than twenty-five cents a grain it is probably worthless.

Therapeutics.—For some unknown reason musk acts as a diffusible stimulant and supports the system. It is also an anti-spasmodic and nervous sedative. In all *low fevers* where the strength of the patient is fast ebbing away, and the nervous symptoms are those of the most advanced depression, rectal injections of musk in starch-water should be employed. The dose should be 5 to 10 grains. This drug is of value, both where *nervous excitement* and *nervous col-*

lapse are present, but is not to be employed until it is absolutely needed, to carry the man past a crisis. If frequently employed it loses its power, and the expense is a needless one.

Musk is one of the best remedies in *obstinate hiccough.* The dose of the tincture (*Tinctura Moschi, U. S.*) is 30 drops to 1 drachm, and of musk itself 5 to 10 grains.

MUSTARD.

Mustard is officinal in the form of *Sinapis Alba, U. S., Sinapis Albæ Semina, B. P.*, or white mustard, and *Sinapis Nigra, U. S.*, and *Sinapis Nigræ Seminæ, B. P.*, or black mustard. Both of them contain an irritant oil (*Oleum Sinapis Volatile, U. S., Oleum Sinapis, B. P.*) as their chief active constituent.

Therapeutics.—Mustard is often used in the form of mustard flour as an emetic, when stirred up in water in the proportion of a tablespoonful to a glass of water. It is also employed as a counter-irritant and a condiment. If given in excessive dose it will cause violent gastritis, and chronic gastritis is often set up by its constant use. It is contra-indicated internally in acute gastritis and all similar states.

When used as a counter-irritant it is applied to relieve the pain of *colic*, due to *flatulence* and *acute inflammation*, in *muscular rheumatism* and *inflamed joints*, in *neuralgia*, and at the nape of the neck in *headache* and *cerebral congestion.* When applied to the ordinary skin it will produce a bad burn if left on more than a few minutes, and should be mixed with wheat flour in the proportion of ¼ to ½ for tender skins Children will not generally stand more than ¼ mustard. The plaster should be made with warm water or vinegar, or even a little brandy may be used. Mustard plaster (*Cataplasma Sinapis*) is officinal in the *B. P.*

The scald or burn produced by mustard is peculiar in its slowness to heal, and in the fact that it is tender and reddened for days. If the burning of the mustard becomes excessive it should be treated by a piece of lint soaked in lime water and olive oil, half and half, or olive oil alone may be used.

The oil of mustard is very irritant, and is almost epispastic in its effects It is only given in the atonic stomach of drunkards in the dose of ¼ to ½ a drop. *Charta Sinapis, U. S.* and *B. P.*, or mustard papers, are sometimes called *sinapisma*, and these afford a ready means of carrying this counter-irritant. They are generally very strong, and should be covered by one or two layers of old and moistened linen to prevent too great an action. (See Counter-irritation.) The compound liniment (*Linimentum Sinapis Compositum, U. S.* and *B. P.*) is composed of the oil of mustard, castor oil, extract of mezereum, and alcohol.

MYRRH.

Myrrha, U. S. and *B. P.*, is a gum resin obtained from *Balsamodendron Myrrha*, a tree of Arabia. It occurs in dark colored tears, and contains an active principle, myrrhin.

Therapeutics.—Myrrh, in medicinal amount, is a stimulant to the circulation, the uterine, and the bronchial mucous membranes.

In *amenorrhœa,* due to functional inactivity, or *anœmia,* "iron and myrrh" is a standard remedy.

The tincture of myrrh, diluted one-half, is useful in ulcerated sore-throat as a gargle, and the pure tincture is sometimes applied with a small brush or the end of the finger, to spongy or tender gums.

In *leucorrhœa,* depending upon uterine trouble, and in chronic cystitis, it is often of service. Sometimes it enters into expectorant mixtures for the later stages of bronchitis. The dose of the tincture (*Tinctura Myrrhœ, U. S.* and *B. P.*) is 10 to 30 drops. It also enters in the composition of *Pilulœ Aloes et Myrrhœ, U. S.* and *B. P.*, dose 2 to 5 pills, and *Tinctura Aloes et Myrrhœ, U. S.* and *B. P.*, the dose of which is 1 to 2 fluidrachms.

NAPHTHALIN.

Naphthalin is a coal-tar derivative, and occurs in colorless mica-like crystals, possesses a peculiar smell, and is soluble in alcohol to some slight extent. After it is taken for some time, or even at once, the patient will state that when he belches the gas has the smell and taste of burning rubber.

The drug possesses distinct antiseptic power, and has been for this reason employed in certain gastric and intestinal diseases, associated with fermentative changes or dependent upon ulceration and organic lesions. In *fœtid diarrhœa* it may be given as a deodorant and cure.

When given to children, as in *summer diarrhœa,* the dose should be $\frac{1}{6}$ to $\frac{1}{4}$ grain every 2 or 4 hours, but adults may take as much as 5 to 10 grains. More than this will disorder the stomach. The drug should be given in powder, in capsules, or with sugar. It has not been as widely employed as was expected when it first came before the profession, and certainly often fails to do good.

NUTMEG.

Myristica, U. S. and *B. P.*, or Nutmeg is the kernel of the seed of *Myristica Fragrans,* an East and West Indian Plant, Mace being the outside covering of the same. Nutmeg is a soporific and nervous sedative exercising a pecular influence over the cerebrum. It is also used as a flavoring substance in somnifacient mixtures and is of value in prescriptions for *serous diarrhœa*. The oil (*Oleum Myristicæ, U. S.* and *B. P.*) is given in the dose of 1 to 3 drops. The spirit or essence (*Spiritus Myristicæ, U. S.* and *B. P.*) is used in the dose of 1 to 2 drachms.

NITRATE OF POTASSIUM.

Nitre (*Potassii Nitras, U. S.* and *B. P.*) or saltpetre occurs in long, needle-like crystals and has a sharp, saline taste. Sal Prunelle is saltpetre melted and run into moulds.

Next to the chlorate of potassium this is the most poisonous of the potassium salts and produces when taken in overdose violent symptoms of gastro-enteritis. While it does not affect the blood it is more irritant than the chlorate.

Nitrate of potassium is rarely employed at present, and has been properly put aside as inferior to the harmless vegetable potassium salts (the citrate, acetate, and bitartrate). If used in *rheumatism* the dose should be 1 ounce in a pint of barley-water or syrup of acacia and water to be taken in divided doses of a tablespoonful every three hours. Nitrate of potasssium papers (*Charta Potassii Nitratis, U. S.*) are made by dipping unsized paper in a solution of the salt of the strength of 20 parts of the salt to 80 parts of distilled water. They are rolled into cigarettes and smoked by *asthmatics* or burned in a pan and the fumes inhaled.

NITRATE OF SILVER.

Nitrate of Silver (*Argenti Nitras, U. S.* and *B. P.*) is a heavy, crystalline solid salt of silver, readily soluble in its own weight of water.

It is officinal as the pure nitrate (*Argenti Nitras, U. S.* and *B. P.*) and as the sticks or fused rolls (*Argenti Nitras Fusus, U. S*) or lunar caustic. The latter are never used in medicine internally, only the crystals being employed. Applied to the tissues of the body or other substances it causes a brown and finally a black stain which is due to the formation of an oxide of silver.

Physiological Action.—Nitrate of silver is one of the few astringent substances which are applicable to inflamed mucous membranes as it is, with lead, bismuth, and zinc, the only drug of the class which is not irritant as well as astringent. Locally applied it acts in pure form as a powerful caustic which is, however, very superficial indeed, as it coagulates the albumen with which it comes in contact and thereby forms a coat which protects the tissues beneath.

The action of the drug upon the circulation, respiration, and similar vital functions is only partly known and has no relation to its employment in medicine.

Nitrate of silver is eliminated from the system very slowly indeed.

Poisoning.—Almost immediately after the ingestion of a poisonous dose of nitrate of silver, violent pain in the belly, with vomiting and purging, comes on. At the same time evidences of widespread gastro-enteritis develop. The abdominal walls are knotted and hard, and perhaps scaphoid. The face is anxious and livid and covered with a sweat. When the vomiting occurs, the ejecta are seen to be brown or blackish or even white and curdy. The lips are stained white, then brown, then black. In some cases the nervous symptoms are severe and convulsions with delirium may occur. The convulsions are epileptiform. Death ensues either from the gastro-enteritis or from centric respiratory failure accompanied by a profuse exudation of liquid mucus into the bronchial tubes.

The treatment consists in the use of common salt, which is the chemical antidote, the employment of opium and oils to allay irritation, and in the ingestion of large draughts of milk and of soap and water. The bodily heat must be maintained.

Chronic Poisoning.—This is more common than the acute poisoning and is quite frequently seen. The most prominent symptom is the slate-blue color of the skin which causes the individual to be most livid and death-like in appearance.

Argyria, as the chronic poisoning is called, ensues from the continued employment of the drug until it is deposited in the tissues. It is then found in every part of the body.

The first signs of discoloration can generally be seen in a darkening of the conjunctiva over the sclerotic coat of the eye, or in a dark line on the inner part of the lips.

The treatment of argyria is not hopeful so far as the color of the skin is concerned, but it may be improved by the use of iodide of potassium to aid in the elimination of the poison.

Therapeutics.—Internally this salt is used as a cure for *gastric ulcer*, and is certainly the best remedy we possess if combined with extract of hyoscyamus or opium in pill form In *chronic gastritis* it is very useful, given in the same manner, where the patient is troubled with sour eructations or where mucous vomiting occurs after meals. When used in these states it should be given in $\frac{1}{8}$ to $\frac{1}{4}$ grain doses, half to one hour before each meal, in order that the stomach may be exposed to its effects and not protected by food.

In *intestinal ulceration* the drug has been highly recommended by Dr. Pepper, but should be given in hard or keratin-coated pills in order that it may escape through the stomach without destruction. In *ulceration* of the *cæcum* and *rectum* and in *acute* and *chronic* *dysentery* the trouble should be attacked by injections of nitrate of silver. If the cæcum is involved the solution must be in large quantity to reach the part affected, but if the rectum is diseased the amount of liquid injected should not exceed four ounces, the bowel in either case being washed out by warm water beforehand to rid it of fæces. Soap and water must not be used for this purpose, as the soap which remains in the bowel will prevent the silver salt from acting. The strength of the solution employed should be 1 drachm to 3 pints of water in cæcal trouble, and 3 grains to each 4 ounces used in rectal trouble. If the latter condition is very obstinate and chronic the strength may be raised to 5 grains to each 4 ounces.

Whenever such a solution is used a solution of salt and water should be at hand and injected if the action is too severe or where the silver has acted long enough.

Nitrate of silver is the only remedy of any value in idiopathic *anterior* and *posterior spinal sclerosis*, but often fails.

Nitrate of silver has been largely used in *epilepsy* and *chorea*, but is now seldom so employed and does little good in most cases.

Dr. William Pepper speaks highly of the continual administration of nitrate of silver in pill form in the dose of $\frac{1}{6}$ to $\frac{1}{4}$ grain through the entire attack of *typhoid fever*, and believes it greatly modifies the severity of the disease.

Externally nitrate of silver is used for many purposes, and will often prevent the *pitting of smallpox* if used in the following manner: On the fourth or fifth day the vesicles are to be punctured by a needle dipped in a solution of nitrate of silver in the strength of 20 grains to the ounce of water. Others simply paint the skin over the eruption with a solution of 5 to 10 grains to the ounce, claiming that it is equally effective and prevents inflammation and suppuration.

Higginbottom has highly recommended the use of nitrate of silver over *erysipelas*, but the practice is not a common one and is now supplanted by better measures. (See Erysipelas.) In other inflammations of a superficial character nitrate of silver is of great value. Painted in strong solution over the scrotum in the early stages of *orchitis* or *epididymitis* it will often relieve the pain and swelling, and *felons* can sometimes be aborted by its early application over the surface of the finger.

In all inflammations of the *pharynx*, *larynx*, *fauces* and *mouth* solutions of silver nitrate are to be used in varying solution. Sometimes after slight exposure the posterior wall of the pharynx suddenly becomes sore and raw, feeling as if the mucous membrane had been scarified. A solution of nitrate of silver will relieve this, and if it is employed in the strength of 60 grains to the ounce is said to be more efficacious and less painful than if weaker solutions are employed.

In *laryngeal phthisis* a spray used from an atomizer in the strength of $\frac{1}{2}$ to 2 grains to the ounce of water may do good service.

In *whooping-cough* Ringer recommends the use of a spray in the strength given above for the purpose of relieving the cough in its violence and frequency and of obtaining a good night's rest. The applications should be made when the stomach is empty as they bring on retching. The end of the atomizer must be within the mouth or the skin of the face will be stained.

In *gonorrhœa* an injection of nitrate of silver of the strength of 2 to 4 grains to the ounce is very useful in the later subacute stage.

In *uterine ulceration* and *leucorrhœa* when the cervix is boggy and tender the application of the solid nitrate of silver stick is of service. Its use is often followed by *headache* about the vertex, and this is to be relieved by 10 grain doses of the bromides.

In *pruritus pudendi*, *ani*, and *vulvæ* a solution of 4 to 6 grains to the ounce should be painted with a camel's-hair brush over the parts to relieve the itching. The application is to be made from two to four times a day.

Bed-sores may be aborted if, as soon as the skin reddens, a solution of nitrate of silver of the strength of 20 grains to the ounce is applied with a brush to the part. This measure fails in paralytics.

Boils which begin in a small limited papule with a surrounding area of inflammation may be aborted by the use of a strong solution of this salt.

In *granular lids*, *conjunctivitis* and similar affections about the eye the use of the nitrate of silver in stick form or in solution is largely employed. (See Conjunctivitis.)

When it is desired to remove nitrate of silver stains they should be washed with a solution, made of cyanide of potassium 2½ drachms, iodine 15 grains, and water 3 ounces.

Administration.—The dose of nitrate of silver is $\frac{1}{6}$ to $\frac{1}{4}$ of a grain in pill form. Mitigated caustic, or diluted nitrate of silver (*Argenti Nitras Dilutus*, *U. S.*, *Argenti et Potassi Nitras*, *B. P.*, is composed of equal parts of nitrate of silver and potassium nitrate and is used as a mild caustic.

The drug when given continuously for a long time should be discontinued four or five days at the end of the second week, as it is so slowly eliminated as to accumulate in the body and cause argyria.

NITRIC ACID.

Nitric Acid (*Acidum Nitricum*, *U. S.* and *B. P.*), the strongest and most corrosive of the mineral acids, is a clear liquid becoming slightly yellow with age, acting, when in pure form, upon the tissues of the body as a powerful caustic. Applied to the mucous membranes, well diluted, it acts as a irritant and astringent and when taken internally acts as a stimulant to the secretory glands of the stomach and small intestines.

It does not relax the bowels as does nitro-hydrochloric acid.

Poisoning.—When nitric acid is taken in concentrated form it produces a widespread gastro-enteritis, great pain in the mouth, œsophagus and abdomen, and finally death, from the inflammation induced, or from collapse. If the patient survives the acute stages he may die from secondary changes in the stomach and bowels, such as stricture or destruction of the peptic tubules. The stain made by acid about the mouth and clothes is deep lemon yellow. Renal irritation is often severe and the stools and urine may be bloody.

The antidotes are any alkali of a mild type, as magnesium, chalk, or whitewash from the walls of the room. The use of oils and opium to relieve irritation and the proper maintenance of bodily heat.

Therapeutics.—Nitric Acid is used externally in medicine as a caustic for *chancres* and *chancroids*, the surrounding tissues being protected by oils or ointments.

It may also be used on *warts*, in *gangrene* to destroy the tissues, and on *phagedœnic ulcers*. Whenever the acid is to be applied a solution of soap and water should be at hand to neutralize its effects as soon as it has acted deeply enough. Nitric acid is also used externally in a dilute form, 5 to 30 drops to the ounce, as a stimulant and astringent to *indolent ulcers*. Internally, nitric acid is used as a tonic and astringent. In the *oxalic acid diathesis* when oxaluria is present nitric acid will give relief when nitro-muriatic acid cannot be obtained, although the latter is far more preferable. When *small ulcers* or *stomatitis* exists in the mouth 3 drops of nitric acid at a dose, in water, will often be of service, but it should be taken through a tube to protect the teeth. In *gastric indigestion*, in which, soon after a meal, sour food regurgitates into the mouth, a few drops of nitric acid will often give relief. In *intestinal dyspepsia* coming on some hours after meals, and in which not only discomfort but pain may be felt in the hypochondrium, nitric acid with some simple bitter tonic is most efficient, and it will often cure the *green diarrhœa* of children, particularly in the summer, bringing about these changes not only by its astringent power but also by its stimulating effect on the intestinal glands. Combined with Fairchild's Essence of Pepsin it will give relief in the *chronic diarrhœa* of children associated with *dysentery*, and in which the stools may be pasty or watery and at the same time ill-smelling.

Ringer recommends the employment of nitric acid in the treatment of *piles*. The strong acid should be used and simply touched to one or two points, not swept over the whole surface. The pain is very slight, or none at all may be felt. A slough results, which when it comes away leaves a cicatrix which as it contracts diminishes the size of the pile.

He also states that a lotion of dilute nitric acid in the proportion of half to one drachm to a pint of water is of service in *bleeding hemorrhoids*, arresting the bleeding, constringing the parts, and relieving the sensation of weight and fulness so often a pressing symptom.

The dose of dilute nitric acid (*Acidum Nitricum Dilutum, U. S.* and *B. P.*) is 3 to 15 drops well diluted and taken through a tube, to protect the teeth.

NITRITE OF POTASSIUM.

Nitrite of Potassium is a salt of potassium, used largely in modern medicine to take the place of nitrite of amyl, but possessing greater stability, and, therefore, more permanent in its effects. It is used in *angina pectoris* or *heart-pang*, in *gastralgia* and even in *epilepsy*. The dose is from 3 to 5 grains, although much larger doses have been employed. These larger doses are, however, not devoid of danger.

NITRO-GLYCERIN.

Nitro-glycerin is a compound which in its pure state is used largely as an explosive, but is employed in medicine, in a dilute form, as a useful drug in those instances where a somewhat rapid and powerful effect is to be exercised over the vascular system. Its physiological action is identical with that of the other nitrites, such as the amyl nitrite, except that it is not so fugacious as the latter, nor so persistent in its effects as the nitrite of sodium or potassium. The dose is 1 to 2 drops of a 1 per cent. solution in a little water or in pill, and no more than this may be employed at one dose. The drug is largely given in *angina pectoris*, sometimes in *epilepsy* and *chorea* and in *gastralgia*. In cases of *asthma* dependent upon engorgement of the mucous membranes of the bronchial tubes it is very serviceable The solution used in medicine is too weak to be explosive. Tablets of nitroglycerin (*Tabellæ Nitro-glycerini, B. P.*) each contain $\frac{1}{100}$ of a grain.

NITRO-HYDROCHLORIC ACID.

Nitro-hydrochloric Acid (*Acidum Nitro-hydrochloricum, U. S.*) is a dark red liquid giving off a distinct odor, of very caustic action, staining the tissues of the body a light yellow. It is officinal in the form of the dilute acid (*Acidum Nitro-hydrochloricum Dilutum, U. S.* and *B. P.*) which is often lemon yellow, in which case it is useless except as an ordinary acid. According to the *U. S. P.* it must be orange yellow. Neither of these colors is, however, proper when we wish to use the acid for its own peculiar effects, and the officinal dilute acid ought to be always supplanted by the freshly mixed strong acid and be of a dark current red color. If this cannot be obtained the physician should make it for himself by adding 4 parts of medicinally pure nitric acid to 16 parts of hydrochloric acid, allowing the mixture to stand in an open bottle until the fumes are no longer given off in excess, when it must be tightly corked and kept in a dark place. The acid ought to be freshly prepared every few days.

Poisoning.—The symptoms caused by poisonous doses are those of violent gastro-enteritis with vomiting and purging of bloody matters. Death may accur from perforation of the alimentary canal, from inflammation of the abdominal viscera, and from destruction of the peptic tubules or constrictions of the œsophagus or bowel. The treatment consists in the use of alkalies such as magnesium, lime, whitewash, soap, and oils, with opium to allay irritation.

Therapeutics.—Nitro-hydrochloric acid is an invaluable remedy in many cases of *indigestion* arising either in the stomach or bowels, as it acts as a tonic and stimulant to secretion. Upon the biliary flow its action is quite marked, and it may cause bilious purging if pushed to any extent. It is therefore largely used in *hepatic torpor*, either acute or chronic, and in the early stages of *hepatic cirrhosis* should always be resorted to. In the *chronic hepatitis* of hot climates it is exceedingly useful, but it is not to be employed in acute sthenic hepatitis as it is a stimulant to the liver, which then needs quieting. When used in *chronic hepatitis* it should be given in full dose and pushed to its physiological limit, as evidenced by the bilious purging produced, or some other signs. In ordinary so-called *biliousness*, which is not biliousness, but intestinal indigestion, this acid is often of great service. (See Indigestion.) It is also of value in *dysenteric diarrhœa*, where the dysentery rests upon defective secretory action on the part of the glands which pour out the proper fluids for digestion, and in *chronic diarrhœa* its persistent use for a week or two should be tried.

Administration.—The strong red acid should be given to the adult in the dose of 1 to 3 drops three times a day, well diluted, and taken through a tube after meals. If the patient is intelligent he should be ordered ½ an ounce of the pure acid and told how to drop it. If not, the physician must order it partly or entirely diluted in the prescription, and order it in so small an amount that it may be renewed before it loses any of its power. Warning should be given of its effects on any clothes with which it may come in contact, and care should be taken that the bottle is held well away from the face when the cork is withdrawn, as the acid, if it is fresh, may fly out and burn the eyes and face.

NUX VOMICA.

Nux Vomica (*U. S.* and *B. P.*) is the seeds of the *Strychnos Nux Vomica*, an East Indian tree. It contains two alkaloids, strychnine and brucine, and depends largely for its medicinal power on the former.

Physiological Action.—When strychnine is given to man or the lower animals it increases reflex activity, respiratory rate, pulse-beat, and arterial pressure, acuity of vision and hearing, and causes general systemic irritation or excitement.

NERVOUS SYSTEM.—On the nervous system strychnine exerts its chief influence. It excites the spinal cord in its motor tracts and probably increases the receptive activity of the sensory centres. It also has some slight influence in exciting the conductive power of the motor and sensory nerves. In overdose it produces spinal or tetanic convulsions by an action exerted on the spinal cord. If death takes place from the drug the motor nerves are found to be depressed, partly as the result of the poisonous action of the strychnine and party as the result of the exhaustion of the nerve-trunks by the convulsing impulses which they have carried.

CIRCULATION.—Nux vomica increases the force of the pulse-beat and the pulse-rate by a stimulation of the heart muscle and its ganglia, while the rise of arterial pressure is due to stimulation of the vaso-motor centre. If very poisonous doses are injected a fall of arterial pressure occurs instead of a rise, which is due to vaso-motor depression and paralysis.

RESPIRATION.—Strychnine is one of the most constant and powerful stimulants to the respiratory centre that we have, and it increases not only the rate but the respiratory capacity.

TEMPERATURE.—Ordinary doses have no effect upon temperature, but poisonous doses may raise it by reason of the convulsions.

ELIMINATION.—Strychnine is eliminated from the body by the kidneys as strychnine and strychnic acid. Most of it is oxidized and destroyed by the liver.

Poisoning.—Where a poisonous dose of strychnine is taken it acts either suddenly or gradually. If suddenly, the man or animal may be thrown several feet, and become rigid, by contraction of his muscles, without any premonition.

If the onset is gradual, some stiffness at the back of the neck and uneasy startings may precede the general nerve-storm. The convulsions are tetanic or tonic, and the body is thrown into opisthotonos, that is, resting on the head and heels at each convulsion.

Sometimes the trunk is twisted side-ways, or with the back in the air. (Emprosthotonos.) The eyes are open and fixed, the corners of the mouth drawn back into *risus sardonicus*, and the respiration, during a severe convulsion, is entirely set aside.

The slightest noise, draught of wind, or touch, may cause a convulsion, or convulsion after convulsion, because the sensory impulse, reaching the spinal cord, causes a spasmodic motor impulse to be sent out.

The convulsions are not absolutely continuous, but periods of utter or partial relaxation occur, during which the patient breathes easily. The cramp-like contractions of the muscles are exceedingly painful, and the patient either dies of cramp asphyxia—that is, through failure of respiration, because his chest muscles are locked in spasm, or much more rarely, from exhaustion.

Treatment of Poisoning.—The attendant should give at once, if no symptoms have yet appeared, inhalations of nitrite of amyl, and meanwhile employ the stomach-pump, using the nitrite to prevent any convulsive tendencies during the operation. Draughts of water containing tannic acid as the chemical antidote are to be administered, and after the stomach is washed out 60 grains of bromide of potassium and 20 grains of chloral in solution are to be given. These are the physiological antidotes, for the bromide of potassium depresses the sensory side of the spinal cord, and the chloral depresses the motor tracts. If the convulsions prevent swallowing the patient must be chloroformed with care, and the physiological antidotes given by the rectum in starch water, muscular relaxation being maintained until the drugs are absorbed. Ether cannot be used, as it is too irritant and too slow. Nitrite of amyl is also a physiological antidote, but it is useless if a complete convulsive attack is present, as it cannot be inhaled if the chest is immovable.[1]

Neither can any other relaxant, such as chloroform, be used under those circumstances. These drugs should be gently given between the paroxysms. If relaxation does not occur the nitrite of amyl should be injected hypodermically.

While a light touch may produce a spasm a firm, hard grasp of the limb often relieves the pain of the cramp. Sensation is preserved unless the asphyxia destroys it.

Differential Diagnosis.—The convulsions do not resemble epilepsy, because they are so distinctly tonic, and never clonic. From tetanus strychnine poisoning is to be separated by the fact that in tetanus the locking of the jaws comes first, while in strychnine poisoning it comes last. The convulsions of tetanus rarely, if ever, completely relax, while those of strychnine do have periods of relaxation. There is a different history in each case. In one, perhaps, an injury, as of a nail run into the foot; in the other, of a dose of poison having been swallowed.

The differential diagnosis from hysterical convulsions is more difficult. The convulsions are rarely so persistently tonic in hysteria, while the peculiar expression of the hysterical type is often seen in this disease. The history of the patient, if obtainable, will throw much light on the case, and aid very materially in the separation of the two conditions.

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[1] See article by author in the Boston Medical and Surgical Journal, November, 1884.

As the treatment of all these states is virtually identical the employment of the measures suggested may be resorted to in each instance, and the diagnosis made afterward.

Therapeutics.—Nux vomica, or its alkaliod, is used for several purposes in medicine. Owing to its bitter characteristics it may be employed as a simple bitter tonic or as one especially influencing the nervous system. It may also be used as a respiratory, cardiac, and ocular stimulant.

In cases of *functional nervous atony*, or depression, strychnine does good, but in organic disease, if used during the period of acute inflammation, as after an apoplexy or in acute infantile palsy, it is distinctly harmful. Some cases of apoplexy can never take the drug without a spasm coming on in the paralyzed part or parts. In acute or subacute neuritis strychnine ought never to be used in any way whatever, as the nerves are already inflamed and are not to be still further irritated. In *progressive lead palsy* large doses should be used constantly to stop the progress of the disease, iodide of potassium also being used to eliminate the lead.

In *amaurosis* dependent upon eye-strain or the excessive use of tobacco and alcohol strychnine is almost a specific, and in eye-strain resulting from insufficiency of the ocular muscles it does great good, curing the weakness and improving the condition of the muscles. According to de Schweinitz, a patient should use ascending doses of the tincture of nux vomica, beginning with 3 drops three times a day, and increasing the amount 2 drops a day until distinct physiological effects are produced. Sometimes 60 drops may be used in twenty-four hours after tolerance is reached.

In *dyspnœa*, from any cause, such as that of old persons with *winter cough* or *bronchorrhœa*, in *emphysema*, *phthisis*, and in *idiopathic shortness* of breath, strychnine is of service, and it is a valuable drug for the treatment of opium-poisoning, preserving the reflexes and stimulating the respiratory centre.

In *atony of the bowels* strychnine is of service, and is to be added to purgative pills to avoid their depressing after-effect on the intestines. Where a lesion exists in the brain, strychnine may be used to keep up the nutrition of a limb which is paralyzed, but if the palsy be due to disease of the trophic cells in the spinal cord, it does little good except to stimulate the remaining cells to greater effort.

According to Ringer, *sick headaches*, due to errors in diet and without much nausea, can be put aside for the day by the use of a drop of the tincture in a teaspoonful of water every five or ten minutes until 10 drops are taken.

Administration.—Abstract of nux vomica (*Abstractum Nucis Vomicæ, U. S.*) is given in the dose of ½ to 1 grain; the extract

(*Extractum Nucis Vomicæ, U. S.* and *B. P.*), dose $\frac{1}{6}$ to $\frac{1}{4}$ of a grain; the fluid extract (*Extractum Nucis Vomicæ Fluidum, U. S.*), dose 1 to 5 drops; the tincture (*Tinctura Nucis Vomicæ, U. S.* and *B. P.*), dose 5 to 30 drops. *Strychninæ Sulphas, U. S.* and *B. P.*, is given hypodermically in the dose of $\frac{1}{30}$ to $\frac{1}{20}$ of a grain and by the mouth in the same amounts.

OPIUM.

Opium (*U. S* and *B. P*) is the juice or milky exudation appearing on the surface of the unripe capsules of White Poppy or *Papaver Somniferum*, a native plant of Asia, now grown in many other parts of the world.

Good opium, according to the *U. S. P.*, should contain at least 9 per cent. of morphine.

The chemical composition of this drug is very complex, no less than seventeen alkaloids having been obtained from it, the most important of which are Morphine, Codeine, Narcotine, Thebaine, Narceine, Papaverine, Pseudomorphine, and Laudanine. It also contains Meconic Acid and Meconine.

Physiological Action.—Opium, when given in full dose, produces in the lower animals, such as the frog, violent spinal convulsions; in the dog, great increase in reflex activity, and in man deep sleep, the spinal symptoms being in abeyance.

NERVOUS SYSTEM.—Opium has a double action on the nervous system. It quiets the brain but excites the spinal cord. In the frog, which has no brain of any size, the spinal action predominates; in man, whose brain is proportionately larger than his spinal cord, the cerebral effect is the dominant influence. In the animals between the frog and man it either produces convulsions and sleep, or sleep alone. If the dose is large, the spinal cord becomes depressed and the reflexes fail. The nerve-endings are also somewhat depressed under these circumstances.

CIRCULATION.—Small therapeutic doses of opium have no effect upon the circulation, but large ones slow the pulse, increase its force, raise arterial pressure and cause the respirations to become deepened and full and at the same time a little slower.

The slowing of the pulse depends upon stimulation of the pneumogastric nerves peripherally and centrically; the increase in pulse-force rests upon the stimulation of the heart muscle and its ganglia; the rise of pressure is due to the increased heart action and vaso-motor stimulation. The respiratory changes depend on the action of the drug on the respiratory centre.

In poisoning all these changes are more marked, and finally go on into a rapid running pulse and great depression, due to a reversal of all the influences named.

RESPIRATION.—In very minute doses opium is a feeble stimula or at least not a depressant. In overdose it is one of the most powe ful paralyzants of the respiratory centres in the medulla oblonga causing death in this way.

TEMPERATURE.—The temperature is raised slightly by full do and lowered by poisonous ones.

TISSUE-WASTE.—Opium acts as a protective to tissue-waste, decreasing the elimination of urea and other evidences of nitrogenous break-down.

ELIMINATION.—The drug escapes if given in excess as morphine, but most of it is destroyed in the body.

PUPIL.—Opium contracts the pupils by a centric stimulation of the oculo-motor nerves and by stimulating the sympathetic.

STOMACH, INTESTINES, AND SECRETION.—Opium depresses the motor activity of the stomach and intestines and thereby produces constipation.

It does this by stimulating the splanchnic inhibitory fibres of the intestine and thereby preventing peristalsis. In very large doses it increases peristalsis by paralyzing these fibres.

Opium checks every secretion in the body except the sweat.

Acute Poisoning.—When opium is taken by man in overdose it causes drowsiness, deep sleep, full breathing, a slow, full pulse, a warm, dry skin, contracted pupils, and pleasant, or, more commonly, in the Anglo-Saxon race, disagreeable dreams or no dreams at all.

Preceding this period there may be a brief one, during which the person feels self-satisfied and contented. The duration of this agreeable sensation only lasts a short time, and if the dose is large does not occur or at once passes off. It has been called the first stage, while the more marked symptoms just described have been grouped into the so-called second stage.

During the sleep of the second stage the patient can be roused by shouting in his ear or by violent shaking, but sinks back into slumber at once on being let alone.

The face is suffused and reddened and may be finally distinctly cyanotic. All of these symptoms resemble those of congestion of the brain. The breathing may be puffing and stertorous. When the patient is awakened he breathes more rapidly, and for this reason the duskiness of the face disappears and the normal hue returns. Death never occurs in the second stage of opium poisoning from the poison alone, but if disease is present death may take place at this time.

The third or fatal stage emerges from the second by a gradual process so that no abrupt line of separation can be noted. The face becomes at first more cyanotic, then pale and livid, the respirations which have been 8 to 10 to the minute, are now only 4 or 5, and finally such prolonged pauses occur that all hope of another respiration is lost by the attendant. While the slow breathing is at first deep it now rapidly becomes shallow, and relaxation is present to the greatest degree. The skin, previously dry, is wet with the sweat of death, the patient is so deeply narcotized that nothing can arouse him and dies from respiratory failure, although the heart ceases almost simultaneously from the asphyxia. The pupils do not dilate in the third stage, except in the relaxation of death.

TREATMENT OF ACUTE POISONING.—After employing the usual methods resorted to with the object of unloading the stomach, and after giving tannic acid as the chemical antidote, the patient should receive one or two cups of strong black coffee, hot and concentrated. The heat is useful in maintaining bodily temperature and the caffeine stimulates the respiratory centre and keeps the man awake. Coffee should be used even before any symptoms come on in order to put them off if possible. If atropine be at hand and the respirations are becoming very slow $\frac{1}{100}$ of a grain should be given hypodermically, but should not be repeated after the respirations increase to 10 or 12. The pupil is no guide as to the action of atropine, as the action of these two drugs on the eye is not antagonistic.

Alcoholic stimulants may be called for, and ammonia as a cardiac and respiratory stimulant may be resorted to.

In the third stage heat should be applied to the trunk and extremities.

Much emphasis has been placed on keeping the patient awake, and it has been thought that the cause of death was the deep sleep.

This is not so. The man must be kept awake in order that he will supplement the efforts of his depressed respiratory centres by voluntary breathing. If he sleeps he forgets to breathe, and sleep means death for this reason and not because sleep is death itself.

Besides the use of the hot strong coffee, just named, the patient may be kept awake by lashing him with switches or by keeping him walking up and down between two attendants. Both of these measures are reprehensible if anything better can be done, the first because it covers the patient with cuts and bruises, the second because it may aid in the production of death by exhaustion. If an ordinary medical electric battery is at hand the full force of the current may be allowed to come in contact with the skin from two small poles wet with salt water, or better still the dry or wire electric brush should be swept over the body while the negative pole is held in the hand of the patient or pressed against his skin. This causes the most exquisite pain in the normal individual, but if the brush is kept moving will not cause any bruises or discoloration. The previous use of strychnine by reason of its action on the respiratory centre and its influence on the spinal cord and nerves is of great service. (See Asphyxia.) Artificial respiration may be resorted to.

Chronic Poisoning.—Morphine or opium when taken constantly generates a habit. The person, or morphine-habitué as he is sometimes called, depends for a comfortable existence on the drug and day by day increases his dose until the most extraordinary amounts are taken by the stomach, or by means of the hypodermic needle. If the drug is withheld a train of symptoms typifying depression or exhaustion ensue. The pulse is scarcely to be felt, horrible mental depression and melancholia come on, the miserable man or woman wrings his or her hands, and begs, screams, howls or yells for morphine, only to break down and cry at its withdrawal. Diarrhœa, of a serious type and most violent character, with cramps in the muscles, may assert itself, and must be controlled by astringents and active treatment, as far as possible free from opium.

A characteristic symptom of chronic opium-eating is the development of the most remarkable and clever lying, in previously truthful persons. In the breath that the patient begs the physician to cure him and not give him another dose, he will lie to obtain the drug in a surreptitious manner and may even have the drug in his mouth at the moment he speaks. It will often be found hidden in the seams of the clothing in small packages, and the nurse should be absolutely reliable and forever on the watch, lest the drug be obtained. Any sudden improvement on the part of the patient should be placed to the credit of more morphine, not to professional skill.

TREATMENT.—The best way to treat such cases is to "taper off" the daily dose, and to decrease a sixth or fourth of the total customary amount each twenty-four hours. The entire stoppage of the drug is unnecessarily severe and its withdrawal in a slower manner than that named is simply prolonging the treatment beyond reasonable limits. Cocaine has been used to tide over the crisis after the withdrawal of morphine, but too frequently the patient passes from opium to the cocaine and finally to the alcohol habit, both of which are equally bad. If the circulation flags digitalis may be given and the remaining symptoms treated as common sense indicates.

Sometimes paregoric is taken in excess, and the writer has seen and treated a case under the care of Dr. Wood which took over a pint of paregoric every day.

When a mother is an opium-eater the newborn child often suffers from collapse on the second or third day after its birth, owing to the lack of its customary dose of opium.

Therapeutics.—Opium is used for relief of five great conditions which will be spoken of *seriatim*, the minor uses of the drug being considered afterward.

PAIN.—Opium, as is known to every one, is the best remedy that we possess for the relief of all forms of *pain*, except in those instances where *neuralgia* exists and where antipyrine and its fellow-compounds exceed it in medicinal value. In one form of pain the drug is not to be employed, namely, that arising from *Cerebral Congestion* or *Cerebritis*, for it is distinctly contra-indicated in these affections, as it makes them worse. In *meningitis*, however, opium is of great service, either alone or combined with mercury in sthenic cases.

In cases of *renal* and *hepatic colic* associated with spasm, and in *dysmenorrhœa*, belladonna and opium given together will relieve the spasm and pain, and yet so counteract each other elsewhere in the body as to be devoid of effect upon other organs. Persons suffering from pain will always bear very much larger amounts of opium than painless individuals.

INSOMNIA.—Opium while capable of producing sleep in almost every case to which it is given, save in those persons who by reason of idiosyncrasy are made wakeful by it, is only to be used in those instances where the sleeplessness is due to pain. If constantly used in insomnia or in pain, the opium habit is rapidly obtained, and for this reason the use of the drug should be alternated with chloral, cannabis indica, and other soporific drugs.

In some cases chloral and morphine when given in combination will so act upon the brain as to produce sleep in very small doses.

In the *insomnia of typhoid fever*, opium may be used, particularly during convalescence, but must be employed most carefully.

INFLAMMATION AND IRRITATION.—Opium seems to possess some influence over inflammation which we cannot explain, and small and large doses are particularly valuable in inflammations of serous membranes, such as *peritonitis, meningitis*, and *pericarditis.* It allays the nervous excitement and anxiety following *hæmoptysis*, and the intense unrest caused by *itching skin diseases*, as, for example, the *irritation of smallpox.* Sometimes intense irritation or inflammation produces so great an effect upon unstriped muscular fibres as to cause spasm or paralysis, as in the retention of urine, *cystitis* or the constipation following inflammation of the bowels from irritating foods; under these circumstances the employment of opium is indicated, and usually is very successful. In irritative coughs morphine does good, given in syrup of wild-cherry bark, in the dose of $\frac{1}{12}$ to $\frac{1}{16}$ of a grain. Wherever the *cough* is in excess of the expectoration, that is, greater than is necessary to free the lung from mucus, morphine may be given in small doses. If the lungs contain more râles after than before its use it must be stopped.

In *strangury* and *rectal inflammation*, provided it is not an acute catarrh, after operation on the pelvic organs and in *cystitis*, suppositories, in the strength of $\frac{1}{4}$ or $\frac{1}{2}$ of a grain of the watery extract of opium, are very useful. In *excessive vomiting* from any cause, except it be from a previous dose of opium, injections of laudanum and starch-water, with a little bromide of sodium, will be found of value. (See Vomiting.)

For *sprains* and *bruises* lead-water and laudanum is one of the best applications. If the skin is broken laudanum may be used alone to relieve pain, and, by its alcohol, to act as an antiseptic. Opium is also a useful drug in internal and external *burns*, to allieve the pain and irritation.

OVER-SECRETION.—In *serous diarrhœa, diabetes insipidus* and *mellitus*, and in over-secretion of all secreting surfaces except the skin, opium may be used.

It is said to decrease the amount of urine before decreasing the amount of the sugar in diabetes.

Opium should not be used in *mucous diarrhœa* until after the mucus already present is swept out of the intestinal canal by castor oil or magnesium sulphate. Minute doses of $\frac{1}{80}$ to $\frac{1}{50}$ of a grain of morphine will sometimes check *summer diarrhœa* in children at once when given hypodermically.

SYSTEMIC STRAIN.—In prolonged strain upon the system, as in great physical effort, or more frequently in *old age*, to smooth out the remaining years of life, and decrease worry, opium is useful. In *asthenic fevers* it is thought to be supportive, but its use is apt to cause so many other conditions, such as constipation, anorexia, or mental depression, that alcohol is much better for this purpose. In very advanced *phthisis* it is often justifiable to give enough opium to keep the patient free from pain and discomfort for the remaining hours of his life, but care must be taken that the dose does not interfere with his breathing, and so hasten death.

In *muscular rheumatism* and similar states, where a "cold" has been taken, opium in the form of Dover's powder will often produce a cure particularly if combined with hot drinks and a hot foot-bath.

In *heart disease*, particularly of the mitral valves, the patient can often only breathe easily while awake, starting up when he falls asleep, and gasping for breath. It is stated by some writers that morphine will relieve this state and permit sleep, but that it will not be of service in aortic disease. While this may be partly true, the drug will often give great relief in all forms of cardiac dyspnœa, and ought always to be tried. Care should be taken that the first dose is small, as in some instances it increases the discomfort. The relief is supposed to be due to cardiac stimulation by the drug, and while this is, no doubt, correct, other cardiac stimulants, such as digitalis, will fail when morphine succeeds. The presence of cyanosis and lividity is said to be no contra-indication to the hypodermic use of morphine under these circumstances, provided the dose is a reasonably small one.

Administration.—Opium itself is used in the form of the powder (*Pulvis Opii, U. S.*) in the dose of from ¼ to 1 grain. The solid preparations are the denarcotized opium (*Opium Denarcotisatum, U. S.*), which is deprived of its narcotine, dose ½ to 2 grains, the pills of opium (*Pilulæ Opii, U. S.*), each 1 grain, and the watery extract (*Extractum Opii, U. S.* and *B. P.*), dose ¼ to ½ a grain. Of the liquid preparations we have paregoric (*Tinctura Opii Camphorata, U. S., Tinctura Camphoræ Composita, B. P.*), dose 1 drachm to 2 tablespoonfuls; laudanum (*Tinctura Opii, U. S.* and *B. P.*), dose 10 to 30 drops; the deodorized tincture (*Tinctura Opii Deodorata,* *U. S.*), dose 10 to 30 drops; the *Vinum Opii* (*U. S.* and *B. P.*), or, as it is sometimes called, Sydenham's laudanum, dose 5 to 10 drops; and *Acetum Opii, U. S.*, or Black Drop, dose 5 to 10 drops.

Under the name of Dover's powder (*Pulvis Ipecacuanhæ et Opii, U. S.*), a powder containing one grain of powdered opium, one grain of powdered ipecac, and eight grains of sugar of milk, is largely used. This is more efficacious if divided into fifths and taken in divided doses. The tincture of ipecac and opium (*Tinctura Ipecacuanhæ et Opii, U. S.*) is given in the dose of 4 to 15 minims.

All the liquid preparations of opium are 10 per cent. strong except paregoric, which is much weaker.

The preparations of opium officinal in the *B. P.* are: *Confectio Opii*, dose 5 to 20 grains; *Extractum Opii Liquidum*, dose 4 to 20 minims; *Pulvis Opii Compositus*, composed of opium, pepper, ginger, caraway fruit, and tragacanth, dose 2 to 5 grains; *Tinctura Opii Ammoniata*, dose ½ to 1 drachm; and *Trochisci Opii* ($\frac{1}{10}$ grain of opium in each), dose 1 to 4.

Pilula Saponis Composita, B. P., is purely a preparation of opium. It is sometimes necessary to give this drug to patients without their knowledge, and it may be prescribed in this way, the patient not learning from the prescription the nature of the medicine.

The *B. P.* also recognizes a liniment (*Linimentum Opii*), and a plaster (*Emplastrum Opii*), for local application, and an enema (*Enema Opii*), composed of ½ a drachm of the tincture of opium and 2 ounces of starch mucilage.

Sulphate of Morphine.

Sulphate of morphine (*Morphinæ Sulphas, U. S.* and *B. P.*) is given in the dose of ⅛ to ½ grain, either by the mouth or hypodermically. Besides the sulphate of morphine we have the acetate (*Morphinæ Acetas, U. S.* and *B P.*), and the muriate (*Morphinæ Hydrochloras, U. S.* and *B. P.*), both given in the dose of ⅛ to ½ grain. In the *U. S. Pharmacopœia* of 1870 a solution, *Liquor Morphinæ Sulphatis*) was officinal, dose 1 to 2 drachms, but it is no longer officinal, and should not be called for. Magendie's solution is sixteen times as strong as this liquor (16 grains to the ounce) and is not officinal. The words "Liquor Morphinæ Sulphatis" will generally cause Magendie's solution to be dispensed in New York State, and care should be taken that poisoning does not result. *Pulvis Morphinæ Compositus, U. S.*, is given in the dose of 10 grains; troches of morphine and ipecac (*Trochisci Morphinæ et Ipecacuanhæ, U. S.*), are given 1 or 2 at a time.

The following preparations of morphine are officinal in the *B. P.*: *Liquor Morphinæ Hydrochloratis*, dose 10 to 60 minims; *Tinctura*

Chloroformi et Morphinæ, dose 5 to 10 minims; *Suppositoria Morphinæ* and *Suppositoria Morphinæ cum Sapone*, each suppository containing ½ grain of morphine; *Trochisci Morphinæ* and *Trochisci Morphinæ et Ipecacuanhæ*, each lozenge containing $\frac{1}{36}$ of a grain of morphine, dose 1 to 4. *Liquor Morphinæ Acetatis* is given in 30 to 60 minim doses. *Injectio Morphinæ Hypodermica, B. P.*, contains 1 grain of the acetate of morphine in each 10 minims of water.

Codeine (*Codeina, B. P.*) is given in the dose of ½ to 1 grain. (See page 137.)

Ordinary opium is apt to produce nausea and depression, as already stated, while the denarcotized opium is deprived of its narcotine, this being one of the chief causes of these disagreeable symptoms. The deodorized laudanum is substituted for the ordinary laudanum for the same reasons. Morphine is used to relieve pain rather than opium, because it does not cause so much constipation, but opium is better to check diarrhœa. Paregoric is particularly useful in diarrhœa because it contains a volatile oil and camphor.

Untoward Effects.—Opium in many persons produces after its primary influence great nausea, and sometimes vomiting. The mental depression may be simply overwhelming and the very fact of having to drag out existence is a curse. These symptoms are said to be largely done away with by the use of 20 grains of bromide of potassium, which must be taken with the drug, and by employing the preparations of opium largely devoid of narcotine such as the deodorized tincture. (See last page.) After the symptoms come on, coffee and stimulants may be used.

Children bear opium badly, and some children are very much more susceptible than others to its influence.

One-eighth grain of morphine has caused death in an adult when given hypodermically. If the drug enters a vein the patient may give one gasp and fall back apparently dead. Sometimes the drug causes collapse, or in other cases an eruption over the body.

Incompatibles.—Morphine is incompatible with tannic or gallic acid or astringent solutions containing them, with alkalies such as potassium, sodium, and ammonium, but the chloride of ammonium is not incompatible. With tincture of chloride of iron it forms a deep red color. (Meconic Acid.)

OXIDE OF ZINC.

Commercial oxide of zinc (*Zinci Oxidum Venale*) is not used in medicine, but in the purified form is largely employed in the shape of *Zinci Oxidum, U. S.* and *B. P.*, which is insoluble in water. In the form of the oxide of zinc ointment (*Unguentum Zinci Oxidi, U. S.*

and *B. P.*) this salt affords one of the most generally used applications in *skin diseases, burns* and *sores.*

In all states where the surface of the skin is dry it is contra-indicated, but where the eruption is moist it is useful. In the *chloasma of pregnancy* the following prescription is of service:

℞.—Zinci oxidi.	gr. iij.
Hydrarg. ammoniat.	gr. jss.
Olei theobromæ	ʒ ijss.
Olei ricini.	ʒ ijss.
Essent. rosæ	gtt. x.

M. S.—Apply to the face night and morning.

In *eczema* with many vesicles use

℞.—Pulv. camphoræ	ʒ ss.
Pulv. zinc. oxidi	ʒ iij.
Glycerinæ	gtt. xl.
Unguent. benzoiniati	℥j.

M. S.—Apply to the part or precede it by powdered bismuth.

In the powdered form zinc oxide is useful in *intertrigo*, and in *conjunctivitis.* With bismuth subnitrate and pepsin, it is largely used by some practitioners in the *summer diarrhœa* of infants or adults.

In the *night sweats* of debility or of *phthisis* oxide of zinc in the following formulæ has been highly recommended, but probably depends largely for its action on the second ingredient.

℞.—Zinci oxidi	gr. xxx.
Ext. belladonnæ	gr. iij

M.—Ft. in pill, No. x. S. One at night before going to bed.

Bartholow recommends the oxide of zinc for *asthma* and *whooping-cough* given, as above, to an adult.

OXYGEN, OXYGEN WATER, OXYGEN PEROXIDE.

The gas oxygen is now widely used in medical and surgical practice in one of these three forms as follows: By the inhalation of the gas itself from a cylinder in which it is compressed until 40 gallons occupy a very small space; by drinking oxygen water, which is distilled water saturated with the gas, and finally, by the use of the dioxide or peroxide of hydrogen which is applied locally to diseased surfaces.

Inhalations of oxygen are useful in the second and third stages of *pneumonia* where the patient is about to die from deficient aëration of the blood with resulting heart-distention. It is also of value in advanced *bronchitis,* particularly of old persons, and for the resuscitation of persons asphyxiated with coal-gas (Hare and Martin). In *phthisis* and other exhausting diseases it will allay dyspnœa and oppression.

In the preparation of the solution of oxygen gas the water must be distilled so that it may be as free from other gases as possible. The bottling should be done under a pressure of 150 to 200 pounds and the contents drawn off by means of a tap such as is used in siphons or for champagne bottles. Birch, of England, has found that the addition of a little nitrous oxide gas to this water adds piquancy to its taste and increases its stimulating effects. The value of this preparation is undoubted and when taken into the body has proved of the greatest service in *chronic dyspepsia*, *persistent vomiting*, and *headaches* both digestive and neuralgic.

In *constipation* depending upon intestinal atony, the gas is said to give relief if the solution be taken just before going to bed. It is hardly necessary to state that the water should be swallowed as soon as possible after it is taken out of the bottle which contains it. In some cases where general *systemic torpor* is present, oxygen water taken after each meal, or even more frequently, may be used with advantage. One or two tumblerfuls may be taken each time.

The *peroxide* or *dioxide of hydrogen* is a colorless, transparent, odorless syrupy fluid, of a specific gravity of 1.452, with a harsh, bitter taste, and is readily soluble in water. It is rarely used in its pure form, but should be employed in the strength of 2 to 5 per cent. with water, which strength is the proportion generally sold as the pure article. As much of the solution sold is worthless the following test for its purity has been recommended by Wallian:

Place a few crystals of permanganate of potassium in a test tube and add to it 1 or 2 drachms of the solution. The violence of the resulting effervescence is in direct ratio to its value as a remedial agent and to its purity.

It is used as an effective application to *ulcers* of the acute and chronic form and upon *burns* and *scalds*. In the presence of *sinuses* the liquid should be used as in ordinary irrigation and the wound dressed antiseptically immediately afterward in the ordinary manner, or as desired by the surgeon. *Tubercular abscesses* are said to yield to its influence with extraordinary rapidity.

In *laryngeal phthisis*, *ulcerative tonsillitis*, ordinary *fœtid sore-throat*, and even in *pulmonary phthisis*, a 2 per cent. solution of the pure hydrogen peroxide is of service when used in a fine spray atomizer.

PANCREATIN.

Under this name a number of firms now sell an extract from the pancreatic gland or juice. It contains, or should contain, the four pancreatic ferments: trypsin, which digests proteids (meats, eggs, etc.); steapsin, which splits up and emulsifies the fats; amylopsin, which has diastatic power—that is, converts starch into sugar; and finally, a milk-curdling ferment.

A preparation equally as useful as the commercial pancreatin may be made by the physician in the following manner:

Take the pancreas of a pig which has been killed about six hours after a full meal, and is therefore active, and after chopping it up finely add to it four times its weight of dilute alcohol and allow it to stand for twelve hours. Decant or filter off the alcohol and give the filtrate in the dose of 1 to 2 drachms; or, better still, as follows: Wash and chop up finely a fresh pancreas and allow the gland to soak in alcohol (absolute) twenty-four to forty-eight hours. After this squeeze out the alcohol and add to the gland ten times its weight of glycerin. This must stand forty-eight hours and then be filtered and used in 30 drop doses to each glass of milk. (See Peptonized Foods.)

PARALDEHYDE.

Paraldehyde is a form of aldehyde used as a soporific and nervous sedative. It possesses the great disadvantages of being given in large dose, possessing a disagreeable taste and odor, and being very apt to disorder the stomach. It kills in overdose by respiratory failure, but is not so depressant to the heart as is chloral. It requires frequent repetition and soon loses its power.

The dose is 20 drops to 1 drachm in capsules, or better still, after the formula of Yvon, as follows:

℞.—Paraldehyde		ʒ ijss.
Alcoholis (90 per cent.)		f ℥ jss.
Tinct. vanillæ		f ʒ ss.
Aq.		f ℥ j.
Syrup. simplicis.	q. s. ad.	f ℥ iv.

M.—S. A dessertspoonful every half hour until sleep is obtained.

PAREIRA.

Pareira, U. S., Pareiræ Radix, B. P., is the root of *Chondodendron Tomentosum*, a plant of Peru and Brazil, and is used as a diuretic of an alterative or stimulant character, and in chronic inflammation of the genito-urinary type in general. The dose of the unofficinal infusion is a wineglassful, and the fluid extract (*Extractum Pareiræ Fluidum, U. S.*) is given in the dose of a teaspoonful three times a day. The *B. P.* preparations of this drug are the decoction (*Decoctum Pareiræ*), dose 1 to 2 ounces, the extract (*Extractum Pareiræ*), dose 10 to 20 grains, and *Extractum Pareiræ Liquidum*, dose 1 to 2 drachms.

PEPO.

Pepo, U. S., Pumpkin Seed, the seed of the ordinary domestic pumpkin, is a useful and efficient vermifuge against the *tape-worm.* The seeds are not only efficient, but harmless to the host of the worm. The outer coverings of the seeds should be removed and the remaining part rubbed up into an emulsion with water, or into an electuary with sugar, the dose of the seeds being 2 ounces. This should be taken on an empty stomach and followed by an active purge.

PEPPER.

Piper, U. S., or black pepper (*Piper Nigrum, B. P.*), is the unripe fruit of *Piper Nigrum*, a vine of India, Java, Borneo and Siam. It contains an alkaloid, Piperine, which is officinal.

Therapeutics.—Black Pepper may be used as a counter-irritant or internally as a *carminative* and *stimulant* to the alimentary canal.

It is also used in all cases where atony of the mucous membrane of the genito-urinary system is present, but is contra-indicated whereever acute inflammation is present, as in *acute gonorrhœa.* It may be used in great *flatulence* with marked relief.

Piperine has been used as an *antiperiodic* with varying success, and is given in the dose of 1 to 5 grains. The oleoresin (*Oleoresina Piperis, U. S.*) is given in the dose of ¼ to 2 drops in laxative pills, to prevent griping. A confection (*Confectio Piperis*) is officinal in the *B. P.*, given in the dose of 1 to 2 drachms.

PEPPERMINT.

Mentha Piperita, U. S., is officinal in the form of the leaves and tops. It has an aromatic odor and taste. Locally applied the oil acts as an irritant and local anæsthetic.

Therapeutics.—Peppermint is used as a domestic remedy very largely for *flatulence* and *infantile colic.* Sometimes the oil is added to purgative pills to prevent *griping*, and it may be employed to cover the taste of many medicines which are disagreeable to take. In this respect it is used as are all the volatile oils. In the *colic* of children of six months to a year, when it is unusually severe and associated with nervous symptoms, the following will be found of value:

℞.—Chloral.	gr. xvj.
Potas. brom.	gr. xxxij.
Aq. menth. piperit.	f℥ ij.

M.—S. Teaspoonful in a little warm water every four hours.

When used in *neuralgia*, oil of peppermint should be placed on a piece of linen or muslin rag and applied over the sore spot. Care must be taken that it does not blister the skin. If the burning is too severe after its removal, a little cosmoline or olive oil should be applied. Oil of peppermint is sometimes placed on cotton and used in toothache, but it is to be remembered that the more menthol is present in the oil the more active will it be, and that the Chinese oil contains more menthol than the American oil.

Administration.—Peppermint is used in the form of the oil (*Oleum Menthæ Piperitæ, U. S.* and *B. P.*), dose 1 to 4 drops; the spirit (*Spiritus Menthæ Piperitæ, U. S.* and *B. P.*), dose 10 to 30 drops; the water (*Aqua Menthæ Piperitæ, U. S.* and *B. P.*), dose 1 to 2 drachms, and finally as the Troches (*Trochisci Menthæ Piperitæ, U. S.*) to be held in the mouth in indefinite number. *Essentia Menthæ Piperitæ, B. P.*, is given in the dose of 10 to 20 minims.

PEPSIN.

Pepsin, B. P., is the digestive ferment of the stomach. That sold in the shops is generally derived from the pig, and is prepared by many persons in many ways. Much of the pepsin of the market contains more peptone than pepsin, and much mucus and albumen. Used with hydrochloric acid in weak solution, it replaces the digestive action of the stomach. Pepsin containing peptone has the peculiar musty smell of peptone, and if the peptone is in excess, will absorb moisture and become sticky on exposure to the air.

Therapeutics.—Pepsin is a much over-rated remedy for indigestion. Pancreatin will always be found more serviceable, and should be given one or two hours after meals. Pepsin should be used at once, after the food or with it. The hydrochloric acid should always be present, as its presence converts any pepsinogen in the gastric tubules into pepsin. Pepsin is officinal in the *U. S. P.* as *Pepsinum Saccharatum*, dose 20 to 30 grains to be of service, which is a weak and almost useless preparation, made up chiefly of milk sugar. *Liquor Pepsini, U. S.*, is given in the dose of 2 drachms. Pure pepsin should be given in 5 to 15 grain doses.

PERMANGANATE OF POTASSIUM.

Potassii Permanganas, U. S. and *B. P.*, is a salt of a dark, purplish-red color, appearing in small crystals and readily soluble in water. In the presence of moisture it rapidly gives up the oxygen which it contains and becomes the binoxide of manganese.

By reason of this oxidizing power the permanganate of potassium is largely used as an antiseptic and deodorant. It should not be employed as a *disinfectant*, because its action is too fleeting.

Permanganate of Potassium (*Potassii Permanganas*, *U. S.* and *B. P.*) is given in the same dose for the same conditions as the binoxide of manganese, but is much less efficacious. It is also very apt to disorder the stomach and irritate this organ.

It is thought to be useful in *dyspepsia*, *flatulence*, *lithæmia* and *obesity*, and in the former states is certainly of service, being a destroyer of the abnormal products by oxidation. Owing to this or other reasons, it has been asserted by Weir Mitchell and Reichert to be the most efficient antidote to *snake venom*, if placed in the wound before the poison can be absorbed. Owing to its rapid absorption of oxygen it acts as an antiseptic, and may be used in the washing of *wounds*, *ulcers* and *sores*, and as a lotion in the form of a gargle, or on a swab in diphtheria and scarlet fever. The solution used should be from 20 to 60 grains to the pint; the former if used on mucous membranes, the latter for sores and wounds. In *fœtid rhinitis* and *otitis media* permanganate solution is useful. When given in solution it should be put with distilled water and should never be mixed in a mortar with any organic matter, as it will explode. A solution (*Liquor Potassii Permanganas*) is officinal in the *B. P.*

PETROLATUM.

Under the name of *Petrolatum*, *U. S.*, or *Unguentum Petrolei*, is sold a semi-solid substance derived from coal-tar and sometimes called Cosmoline or Vaseline.

Owing to its soothing powers and non-rancidity, it is used as an emollient dressing in sores and general skin affections. It has no value except as a protective, and may be given in capsules in cases of gastro-intestinal irritation in any quantity as a soothing treatment. It does not affect the passages from the bowels and is not absorbed, although assertions to the contrary have been made. It is a useful vehicle for medicines for the skin. Under the name of fluid or liquid cosmoline a fluid form is sold, and used as a spray in rhinitis and after irritant applications to the nasal cavities.

PHENACETINE, ACETPHENETIDINE.

This is another one of the coal-tar products introduced several years ago as an antipyretic of the same character as antipyrine, and while more apt to disintegrate the blood in large amounts than the latter drug, is not very dangerous, because its influence upon other vital functions is not severe.

Physiological Action.—Unfortunately our knowledge of the physiological action of phenacetine upon the nervous system is not as thorough as might be desired. We know, however, that it is a distinct nervous sedative, and that it acts particularly on the spinal cord in its sensory columns.

Upon the circulation the drug has little or no effect, unless given in doses far above those generally employed, or continued in overdose for some time. The blood after the ingestion of these doses becomes dark and blackish from the formation of methæmoglobin, and the urine becomes after full doses dark-yellow and reacts to Fehling's solution. Upon normal bodily heat and the heat of fever the drug exerts a depressing effect, decreasing the production and dissipation of heat.

Therapeutics.—Our knowledge concerning the influence of phenacetine upon the human body in disease, may be divided into two separate parts, in much the same manner that we divided antipyrine—namely, its uses as an antipyretic and as an analgesic.

Like the other members of the antipyretic group which are blest with this double action, its antipyretic influences were first observed, and shall therefore be spoken of first.

The employment of this drug in medicine was first attempted by Hinsberg and Kast, who at the very start spoke of it in the highest terms of praise. They found that it seldom, if ever, caused serious untoward effects and that its power over fever in the dose of from 3 to 8 grains was quite extraordinary. Very shortly after the paper of these writers appeared, Kohler published the report of its use in some fifty cases in the clinic of Bamberger of Vienna, the febrile affections being tuberculosis, pneumonia, typhoid fever, pleurisy and several other diseases of like character. He found, as have most of his successors, that the fall of fever does not occur for nearly half an hour after the dose is taken, and continues for from four to eight hours afterward.

As a general rule, sweating was not noted as being present to any great extent, but in phthisis and advanced typhoid there can be no doubt that chilliness and abnormal temperature may come on. Cyanosis and vomiting did not occur in a single one of Kohler's cases. In a very instructive case of pneumonia due to septic infection in a patient of twenty years, phenacetine not only lowered the fever, but in addition decreased, to a large extent, the blood in the urine, and did not in the slightest degree influence the kidneys unfavorably. That the drug has power is evidenced by the fact that Kohler used it only when the temperature reached as high as 103°, 104°, or 105° F., and in these cases the temperature fell not less than from three to five degrees.

It is a very important fact to be remembered that morning doses of phenacetin seldom have as powerful an influence as evening doses. Two morning doses are only equal to one evening dose in most cases, and it is generally found better in phthisis to give the drug about noon to prevent the evening exacerbation of temperature than to resort to it at a time nearer the pyrexial period.

The conclusions of Kohler have been confirmed by Hoppe in a long series of studies, and this writer also points out the deleterious excess of apyrexia, which sometimes comes on in debilitated cases of phthisis.

One of the advantages of having several drugs belonging to one class is the benefit often derived from the use of one where another has failed. Thus Huber found that in several instances phenacetine was successful where antipyrine had not acted, and believes it to be the more powerful drug of the two, a conclusion also reached by Heusner, who thinks that 15 grains of phenacetine are equal to half as much antifebrin and to 30 grains of antipyrine. Lepine, who has done so much with the other antipyretics, also believes it to be superior to them all, and in this Guttmann is largely of the same opinion.

These conclusions are, in the author's belief, far too favorable, for while he has found the drug to possess powerful antipyretic activity and to be useful in nearly all the fevers where antipyrine can be employed he does not look upon it with the same degree of confidence that he does the other drugs, when anxious to reduce a fever which seems dangerous and worthy of rapid and certain reduction.

Upon the nervous system phenacetine acts as an antineuralgic, is of service in *migraine* and ordinary *headache* from *eye-strain*, in *tabes dorsalis*, in *intercostal neuralgia*, and in *rheumatism*. Sometimes it cures these troubles when antipyrine fails. Altogether we may consider phenacetine a rival of antipyrine as a reliever of pain.

PHOSPHATE OF SODIUM.

Sodii Phosphas, *U. S.* and *B. P.*, is a preparation rarely, if ever, used to supplant phosphorus, and has an entirely different effect. It is particularly useful in bottle-fed children, who continually alternate between *diarrhœa* and *constipation*, and is also useful in rickets. It should be added to each bottle of milk in the dose of 2 to 4 grains. It is more laxative than the contrary.

PHOSPHIDE OF ZINC.

Zinci Phosphidum, *U. S.*, is often used in place of phosphorus, owing to its greater stability and readiness of prescribing. The dose is $\frac{1}{20}$ to $\frac{1}{12}$ of a grain three times a day. It is used in gelatin-coated pills.

PHOSPHORUS.

Phosphorus, *U. S.* and *B. P.*, is a non-metallic element generally obtained from bones and is very soluble in oils, less so in ether and alcohol. Its odor is very characteristic and peculiar. When placed in a dark room after exposure to light it is luminous and if exposed to the air will ignite. It should be kept in tightly stoppered bottles under water. Very commonly it is contaminated by arsenic and sulphur.

Physiological Action.—Phosphorus is found in large amount, comparatively speaking, in the bones and in the nervous system, and is a stimulant to both. It is, therefore, a direct replacer of nervous tissue and a cause of bone-growth. Upon tissue-waste the drug acts as a depressant, thereby preserving the body, for it decreases the elimination of urea and diminishes the quantity of carbonic oxide exhaled.

Upon the growth of bones phosphorus has a most remarkable influence causing, when it is given to young animals, great increase in the size of the parts. The first change noted is an enlargement which consists in a jelly-like mass containing little or no bone salts, and this is finally converted into very hard material which may fill the entire canal in the centre of the bone. Kissel has denied this, but his results must be doubted in view of the thorough studies of Wegner.

Acute and Chronic Poisoning.—When phosphorus is taken in poisonous dose, often from the ends of matches, no symptoms may come on for eight or ten hours. At the end of that time the peculiar taste of phosphorus may be noticed in the mouth, the breath is heavily laden with its odor, and burning pain in the œsophagus, stomach, and abdomen ensues. Vomiting and purging now assert themselves, and both the matters vomited and passed from the bowels may be luminous in the dark owing to the presence of phosphorus. The vomiting is at first made up of food, then mucus, then bile, then perhaps blood. All the symptoms of a mild gastro-enteritis may develop, but it is to be noted that constipation of an obstinate type may replace the purging. Very soon the liver increases in size and gives rise to general hypochondriac pain and tenderness as well as local swelling. At the end of twenty-four hours, or, perhaps, after the second day, a cessation in the symptoms occurs, and, if the physician be not on his guard, will lead him to a hopeful prognosis. In the course of a few hours jaundice begins in the conjunctiva and then extends over the entire body. With the onset of jaundice the vomiting and pain return with renewed vigor. The matters vomited are often the color of "coffee grounds," due to exuded and altered blood. The bowels are absolutely confined, or the few hard masses passed are white and clay-like because of the absence of biliary coloring bean," to determine whether a person is guilty or not of a crime. If an individual eats it and survives he is guiltless, but if he dies he is guilty, according to this rather fatalistic belief. If he does survive it is generally by reason of the calabarine producing vomiting and purging, and so ridding the stomach of the poison before it is absorbed.

Poisonous doses cause muscular tremors, followed by complete muscular relaxation. The pupils contract, the respirations become slow and irregular, and all reflex action fails. Vomiting or purging may or may not occur.

TREATMENT OF POISONING.—This consists in the use of atropine, which is the physiological antidote, in the employment of heat to the body, and the use of respiratory and cardiac stimulants.

Therapeutics.—Calabar bean is employed in many affections, such as *trismus neonatorum*, *tetanus*, and other *spasms*, with only moderately good results. It is, however, of value in atony of the bladder and intestines, and in catarrh of the bowels. The author has used it with great success in *gastric* and *intestinal dilatation*.

In *bronchial asthma* and *emphysema* it will aid in the expulsion of the mucus by its influence over the muscular fibres in the walls of the tubes. It is also useful in purgative pills. (See Constipation.)

Administration.—Physostigma is used in the form of the extract (*Extractum Physostigmatis*, *U. S.* and *B. P.*) in the dose of $\frac{1}{8}$ of a grain, which may be readily increased to $\frac{1}{4}$ of a grain.

The tincture (*Tinctura Physostigmatis*, *U. S.*) is given in the dose of 10 to 40 drops.

Eserine (*Physostigmina*, *B. P.*) may be used in the dose of $\frac{1}{30}$ of a grain three times a day. In the eye, in the strength of 1 to 2 grains to the ounce of water, eserine is used in *iritis* to break up bands, and in *corneal ulcerations*, and for the relief of *glaucomatous* states with high intra-ocular tension. If, for any reason, *atropine mydriasis* is to be overcome rapidly, eserine is to be used, but it is not so powerful as atropine, and it will require larger amounts of the solution to produce contraction than it took of atropine to cause mydriasis. *Lamellæ Physostigminæ*, *B. P.*, each contain $\frac{1}{1000}$ of a grain of physostigmine.

PITCH.

Pix is a resinous exudation derived from several species of pines, firs, and spruces, and is, in one of its forms, obtained by the evaporation of wood-tar. It is used for various purposes, according to its derivation. Burgundy Pitch (*Pix Burgundica*, *U. S.* and *B. P.*) is derived from Norway spruce or *Abies Excelsa*, a plant of Europe and Asia. It softens and melts at the temperature of the body, and is useful in plasters. In *muscular rheumatism* and in *chronic bron-*

chitis, it is a mild and fairly useful local remedy. In the form of the plaster (*Emplastrum Picis Burgundicæ, U. S.* and *B. P.*) and in the form of warming plaster (*Emplastrum Picis cum Cantharide, U. S.*), it is employed for deep-seated *sprains* and *bruises* as a mild counter-irritant, which may blister tender skins. Canada pitch (*Pix Canadensis, U. S.* and *B. P.*) is obtained from the hemlock spruce of Canada and the United States, and is used for the same purposes as Burgundy pitch. The plaster (*Emplastrum Picis Canadensis, U. S.*) is employed for the same conditions as the plaster of Burgundy pitch. Under the name of *Pix Liquida, U. S.* and *B. P.*, or Tar, we have an empyreumatic oleoresin obtained by destructive distillation from *Pinus Palustrus* and other varieties of pine. It is a thick, dark oil, slightly soluble in water, and soluble in alcohol, oils, and solutions of potassa and soda. By distillation from this we obtain oil of tar (*Oleum Picis Liquidæ, U. S.*), which is sometimes used by inhalations from an atomizer in *bronchitis*, but is not a particularly useful application. It should be diluted with some other oil or fluid cosmoline. Tar is used in *sub-acute* and *chronic bronchitis* in 2-grain pills, and as a remedy in *gastro-intestinal catarrh*. Externally, it is used in *psoriasis* and other skin diseases needing stimulation. In *obstinate diarrhœa* Wood has highly recommended a mixture of tar made as follows: Add a pint of tar to a gallon of lime-water, and allow this solution to stand one week, stirring it every few hours. Decant the clear liquid and percolate it through powdered wild-cherry bark, allowing one ounce of the bark to be present for each pint passed through it. The dose is a wine-glassful.

In *chronic bronchitis* tar-water is largely used, as a popular remedy, in Europe and England. Tar-water is made by shaking 1 part of tar with 4 parts of water several times during twenty-four hours, decanting and filtering. The dose is from 1 to 2 pints a day as a drink. It at first increases the expectoration but finally decreases it.

Syrup of tar (*Syrupus Picis Liquidæ, U. S.*) is simply sweetened tar-water.

In *skin diseases* of the dry, scaly sort tar ointment (*Unguentum Picis Liquidæ, U. S.* and *B. P.*), equal parts of tar and suet, is very useful if frequently applied. It should not be used on the face as it will stain the skin.

Wine of tar (*Vinum Picis*) is made by adding together tar 1 pint, glycerin, white wine, and honey, half a pint of each, dilute acetic acid 1 ounce, and 3 quarts of boiling water, and shaking constantly at a temperature of 160° Fahr. for several hours. It is then set aside to stand for some days and repeatedly filtered or strained through muslin. The dose is 1 to 4 ounces. It may be used instead of tar-water or tar syrup.

PODOPHYLLUM.

Podophyllum, *U. S.*, *Podophylli Rhizoma*, *B. P.*, May Apple or Mandrake, is the rhizome and small roots of *Podophyllum Peltatum*, a plant of the United States and Canada. Podophyllum contains a resin podophyllin.

Therapeutics.—Podophyllum is the slowest acting purge in the pharmacopœia. In small doses it is laxative, but is purgative and almost drastic in larger doses. In overdose it may produce gastro-enteritis. The drug particularly excites the flow of bile and is used as a cholagogue. It is best when the stools are dark in color, calomel being indicated when they are light. In children one or two months old who have *hard stony stools* podophyllin is the best remedy. The dose should be given by dissolving a grain of the resin in a drachm of alcohol and using 2 drops of this on sugar once or twice a day. In children who suffer from *diarrhœa* in which the passages consist almost entirely of water, and the passages have a peculiar musty smell or mouse odor podophyllin in the dose of $\frac{1}{60}$ to $\frac{1}{50}$ of a grain is of service, seeming to control the passages and make them normal. This treatment will often succeed when all else fails, and this holds true in the *chronic diarrhœas* of adults, though the drug should be given in somewhat larger amounts in such cases. It will also check *vomiting* in these doses in some instances.

Administration.—Podophyllum is used in the form of the extract (*Extractum Podophylli*, *U. S.*), dose 5 to 10 grains, as the abstract (*Abstractum Podophylli U. S.*), dose $\frac{1}{2}$ to 1 grain, the fluid extract (*Extractum Podophylli Fluidum*, *U. S.*), dose 2 to 20 drops, and more commonly than all as the *Resina Podophylli*, *U. S.* and *B. P.*, or Podophyllin, which is the best preparation. The dose of this is from $\frac{1}{20}$ to $\frac{1}{10}$ of a grain as a laxative, and from $\frac{1}{10}$ to $\frac{1}{2}$ a grain as a purge. The tincture of the resin (*Tinctura Podophylli*, *B. P.*) is given in the dose of 15 minims to 1 drachm.

PRUNUS VIRGINIANA.

Prunus Virginiana, *U. S.*, Wild Cherry as it is incorrectly called, is the bark of *Prunus Serotina*, a large tree of the United States and Canada. It contains two substances known as emulsin and amygdalin, which when they come together in water form hydrocyanic acid.

Therapeutics.—Wild cherry bark is largely used as a domestic tonic, and in the form of a syrup as a vehicle for *cough* mixtures.

It has been supposed that the hydrocyanic acid present allays the cough, but this is doubtful, as the acid is very fleeting in its effect and present in very small quantity.

Administration.—As a tonic it is used in the form of the infusion (*Infusum Pruni Virginianæ, U. S*), dose ½ to 1 ounce, and the fluid extract (*Extractum Pruni Virginianæ Fluidum, U. S*), dose 30 drops to 1 drachm. The syrup (*Syrupus Pruni Virginianæ, U. S.*) is given in the dose of 1 to 4 drachms.

QUASSIA.

Quassia, U. S., Quassiæ Lignum, B. P., is the wood of *Picræna Excelsa*, a large tree of Jamaica and other islands of the West Indian group. It contains an active principle named quassin, which is intensely bitter and irritant to mucous membranes. Quassia is a simple bitter tonic, which has been used very largely in domestic medicine and by the medical profession. It is very efficient, and is supposed to be particularly useful in the *anorexia* following malarial fevers, and has even been thought to possess antiperiodic power. In *simple dyspepsia* with *eructations* after meals, not due to gastritis, it is very serviceable.

In *seat-worms* (*Oxyuris Vermicularis*) or *thread-worms*, as they are often called, injections of the infusion of quassia are the most efficacious and useful remedial measures we possess, as well as being very harmless. The bowel should be well washed out by soap and water and a half-pint of an infusion, made by adding 1 or 2 ounces of quassia chips to a pint of water, be injected and retained for some minutes. A few such injections will invariably kill the parasites, provided the bowel is first well washed out with soap and water.

Administration.—The tincture (*Tinctura Quassiæ, U. S.* and *B. P.*) is given in the dose of ½ a drachm to 1 drachm, the fluid extract (*Extractum Quassiæ Fluidum, U. S*) ½ a drachm, and the extract (*Extractum Quassiæ, U. S.* and *B. P.*) 1 to 3 grains. The infusion (*Infusum Quassiæ, B. P.*) is given in the dose of ½ to 2 ounces, and is made by macerating 1 drachm of quassia with 10 ounces of water, and allowing it to stand twenty-four hours or more.

QUERCUS ALBA.

Quercus Alba, U. S. or White Oak in infusion is used as an astringent injection in *gonorrhœa* and *vaginitis* in the female, where a large amount of fluid is necessarily employed. It is also used in *prolapse of the rectum*, in *hæmorrhoids*, in *leucorrhœa* and as a gargle in *sore-throat*. It stains the clothing very slightly.

Quercus Tinctoria is equally efficient, but is seldom used because it stains the clothes very badly. Either may be used in infusion of the strength of one ounce to the pint. In the form of the powdered bark it is often used as an astringent poultice to freely *running sores* to check the discharge. *Decoctum Quercus* is official in the *B. P.*

RESIN OR ROSIN.

Resina, *U. S.* and *B. P.*, is Resin or Rosin, the mass left after the distillation of turpentine, and enters largely into plasters, cerates, and similar preparations. Its burning fumes when inhaled are said to be of value in cases of *chronic bronchitis*. *Ceratum Resinæ*, *U. S.*, is used in chilblains and superficial scalds, and *Emplastrum Resinæ*, *U. S.* and *B. P.*, is adhesive plaster. *Unguentum Resinæ* is a *B. P.* preparation used for the same purposes as the plaster or cerate.

RESORCIN.

Resorcin is the *meta* compound of the group of which hydrochinone is the *para* and pyrocatechin the *ortho*, and occurs in clear crystals of a slightly reddish hue. It is quite soluble in water, alcohol, and ether.

Physiological Action.—Resorcin is an irritant to mucous membranes, and when taken internally in poisonous doses causes deafness, giddiness, salivation, profuse sweat, unconciousness, and clonic convulsions. The heart is at first slowed by vagal stimulation, then becomes very rapid from vagal palsy.

Therapeutics.—Resorcin has been found of service as a remedy for *whooping-cough*, given in the dose of 10 drops of a 2 per cent. solution, or used in a spray of the same strength, which is the better method of the two.

Resorcin has also been employed in a spray in a 20 per cent. solution in *hay-fever* with remarkably good effects. It has been used as an antipyretic, but is not serviceable, and has feeble power against strong fevers.

The chief use of resorcin is in skin affections of a sub-acute or chronic character, such as *eczema*, with much induration, and in *psoriasis*. In these states an ointment of the following character, well applied, is of service.

℞.—Resorcin	ʒj.
Zinci oxidi	ʒj.
Ung. aquæ rosæ	ʒx.

M.—S. Apply to the part.

RHUBARB.

Rheum, *U. S.*, *Rheum Radix*, *B. P.*, is the root of *Rheum officinale*, a plant of Thibet, but which is cultivated in America and elsewhere. It is also derived from China, and this variety is known as Chinese Rhubarb. Several alkaloids are contained in it, all of which are unimportant and never used alone, except chrysophanic acid.

Physiological Action.—According to the studies of Prevost and Binet, rhubarb acts inconstantly upon the flow of bile, sometimes increasing it, sometimes having no effect, but according to those of Rutherford and Vignal it never fails to stimulate biliary secretion. Owing to the astringent properties possessed by rhubarb it does not act excessively, and improves the appetite, digestion and intestinal tone.

Therapeutics—Whenever it is desired simply to *unload the bowels* without affecting the general system, rhubarb may be employed. In other words, it is useful in simple constipation. In children a state is very commonly seen in which *constipation* will be replaced by diarrhœa if any ordinary laxative is employed, and in these instances rhubarb is the best remedy, as it is astringent and prevents any after-effects beyond those produced by the dose. In the *summer diarrhœa* of children, where the stools are green, rhubarb is often used to empty the bowels of fermentative products before direct treatment is instituted.

Administration.—The preparations of rhubarb are very numerous indeed. Rhubarb itself may be given in the dose of 20 grains of powder and small pieces of the root are habitually chewed for constipation. *Extractum Rhei, U. S.* and *B. P.*, is given in the dose of 5 to 10 grains in pills; *Pilulæ Rhei, U. S.*, each contain 3 grains of rhubarb; *Pilulæ Rhei Compositus, U. S.* and *B. P.*, contain 2 grains of rhubarb and 1½ of aloes and are given in the dose of 2 or 3 pills. *Pulvis Rhei Compositus, U. S.* and *B. P.*, contains magnesium, dose 20 to 40 grains; *Extractum Rhei Fluidum, U. S.*, is given in the dose of 20 to 30 minims. *Syrupus Rhei, U. S.* and *B. P.*, is given in the dose of one drachm to a babe, 4 drachms to an adult, although rarely used for such persons. *Syrupus Rhei Aromaticus, U. S.*, is given in the same dose and to the same class of cases. *Tinctura Rhei, U. S.* and *B. P.*, is used in the dose of 1 to 2 drachms, and *Vinum Rhei, U. S.* and *B. P.*, in the dose of 1 to 4 drachms. *Tinctura Rhei Aromatica, U. S.*, is used in the dose of ½ to 1 drachm and *Tinctura Rhei Dulcis, U. S.*, 2 to 3 drachms.

The aromatic syrup is commonly employed for children and the compound pills for adults. *Infusum Rhei, B. P.*, is given in the dose of 1 to 2 ounces, and *Mistura Rhei et Sodæ, U. S.*, in the dose of 2 drachms to 3 ounces.

RHUS AROMATICA.

Sweet Sumac is unofficinal, but has been so largely used of late that it deserves notice. In *hæmaturia, menorrhagia, diabetes insipidus,* and *urinary incontinence* in children it has been highly praised. In the latter affection a sufficient amount of experience has been acquired to show that it really is of benefit. (Mueller and Unna.) Rhus Aromatica should be used in the form of fluid extract derived from the bark of the roots according to the general directions in the Pharmacopœia for making fluid extracts. The dose as a remedy for *urinary incontinence* is 15 drops of this preparation. Adults may take 15 to 60 drops. The drug is best given in glycerin and water.

RHUS GLABRA.

Rhus Glabra, U. S., smooth sumac, is the fruit of *Rhus Glabra*, and contains tannic and malic acids as its chief constituents of medicinal value. In the fluid extract (*Extractum Rhus Glabræ Fluidum, U. S.*) we have an officinal preparation which is very efficient as a gargle for *sore-throat* when diluted with glycerin and water or prepared according to the formulæ given under Chlorate of Potassium.

ROCHELLE SALTS.

Sodii et Potassii Tartras, U. S., Soda Tartarata, B. P., has been used as a saline cathartic in the dose of ½ an ounce, but is almost never used alone. It is the purgative constituent of seidlitz powder.

ROSA CENTIFOLIA.

Rosa Centifolia, U. S., Rosæ Centifoliæ Petala, B. P., Pale Rose, possesses almost no medicinal value, but is mentioned because its officinal preparations are largely used in practice.

Aqua Rosæ, U. S. and *B. P.*, is used as a diluent or solvent for preparations, such as astringents, which are to be used locally, as in *gonorrhœa*. It may also be used internally for these purposes. *Unguentum Aqua Rosæ, U. S.*, is "cold cream," and is largely used as an emollient application to *small burns, sores, cuts*, and *scratches* and on *chapped hands* and *lips*. It is much improved if a little glycerin and benzoic acid are added to keep it sweet in warm weather.

ROSA GALLICA.

Rosa Gallica, U. S., Rosæ Gallicæ Petala, B. P., Red Rose, contains more gallic and tannic acids than pale rose and is astringent.

From it are prepared the *Extractum Rosæ Fluidum, U. S.*, dose 5 drops to 2 drachms, used to flavor other extracts, the *Confectio Rosæ, U. S.* and *B. P.*, used as a basis for pills; *Mel Rosæ, U. S.*, or honey of rose, for local application or a vehicle for gargles, and the *Syrupus Rosæ, U. S.* and *B. P.*, dose 1 to 2 drachms, as a flavoring substance. The acid infusion (*Infusum Rosæ Acidum, B. P.*) is given in the dose of 1 to 2 ounces.

RUBUS IDÆUS OR RASPBERRY.

Rubus Idæus, U. S., or Raspberry, is used for the preparation of a syrup (*Syrupus Rubi Idæi, U. S.*) which is employed very largely as an elegant vehicle or flavoring mixture. The leaves are often used as a decoction or infusion in *diarrhœas* where an astringent is needed by housewives in domestic medicine.

RUE.

Ruta Graveolens is the source from which we derive the oil of Rue (*Oleum Rutæ, U. S.* and *B. P.*).

Physiological Action.—Locally applied rue is an irritant, producing vesication, and if taken internally gastro-enteritis, which may be most severe. It is eliminated by the lungs, kidneys, and skin, and its odor is easily noticed in all these secretions. If the dose be poisonous, vomiting, great pain in the belly, and epileptiform convulsions come on, but death has rarely occurred.

Therapeutics.—Rue has been used as an abortifacient, but with great danger to the mother. Its action is most uncertain even when poisonous doses are used. It has been employed in *colic* as a carminative and seems to be really valuable in atonic *menorrhagia* and *metrorrhagia.*

Given in capsule it has been employed for *lumbricoid* or *roundworms*, but ought not to be so used. The dose is 3 to 6 drops.

SACCHARIN.

Saccharin is a compound first prepared by Fahlberg under the direction of Professor Remsen, of Johns Hopkins University, and further studied by him in the Chemical Laboratory of the University of Pennsylvania. It is a remarkably sweet substance 220 times stronger than sugar in sweetening power, and is used largely to sweeten glucose and in confections. It escapes from the body unchanged, has no physiological action, and may, therefore, be used in diabetes and gout to sweeten coffee, food, or medicine. The dose is indefinite, but it is to be noted that a very few grains will sweeten a very large bulk of material.

SALICYLATE OF MERCURY.

Salicylate of Mercury is a drug which has come into quite general use since the introduction of the hypodermic method of administering mercury in syphilis. It is to be suspended in paraffin oil in the proportion of 22 grains of the salicylate of mercury to 3 drachms of the oil, and before it is used the bottle must be well shaken in order that the insoluble mercury may not remain at the bottom. It is of great importance that the needle and syringe shall be thoroughly cleansed after each injection, as the insoluble drug readily clogs the opening of the instrument. At first one minim of the mixture just named should be injected deeply into the gluteal region every fourth day, and this may be increased to every second day if no systemic evidences of the action of the drug appear.

SALICYLIC ACID.

Salicylic Acid (*Acidum Salicylicum, U. S.* and *B. P.*) is derived from carbolic acid by treating it with caustic soda and carbonic acid at a moderate heat. It is soluble in 300 parts of water and 4 parts of alcohol.

Physiological Action.—To mucous membranes salicylic acid acts as an irritant. (See Poisoning.)

NERVOUS SYSTEM.—Upon the nervous system salicylic acid exerts comparatively slight effects in medicinal doses, causing buzzing in the ears, decrease of the reflexes, and finally in overdose epileptiform convulsions by an action on the brain.

CIRCULATION.—Upon the circulation the effects of salicylic acid are not very marked in medicinal dose. It undoubtedly has a depressant rather than a stimulant effect, but the depression is very slight. It is sufficient, however, to make the use of the drug in cases of feeble circulation worthy of thought and care.

RESPIRATION.—Salicylic acid stimulates the pulmonary vagi and respiratory centre, but if the dose be poisonous death is due to respiratory failure.

TEMPERATURE.—The effect of salicylic acid on temperature has been studied by the author with a good deal of care. The drug acts as a distinct antipyretic upon fevered states and is a slight depressant of normal bodily heat. The conclusions of Gedl, Fürbringer and Sée also show this, and those of Danewsky point to it. In the experiments of North upon man after and during exercise the effects were marked. According to the author's studies, the drug lowers fever by diminishing heat-production and increasing heat-dissipation, but this is by no means positively decided.

ABSORPTION AND ELIMINATION.—Salicylic acid is absorbed from the stomach as a salicylate of sodium and so circulates in the blood. It is eliminated by the kidneys, and by all the secretions. In the urine it appears as salicyluric acid. The urine after large doses is dark olive-green, and the change in color is due to the presence of indican and pyrocatechin, which are formed by the action of the pancreatic juices upon the drug in the intestine. The presence of salicylic acid in the urine is to be discovered by the addition of a solution of the chloride of iron to the fluid which causes the appearance of a violet color.

Poisoning.—Salicylic acid when taken in excessive dose causes profuse sweating, roaring in the ears, dimness of vision, headache, partial or total deafness, and a decided fall in temperature. The pulse becomes weak and relaxed, and finally ptosis, strabismus, and general paralysis ensue. The urine and fæces are passed involuntarily, the urine being olive-green. The respirations at first are quickened and deepened, but finally become shallow and feeble, death ensuing from respiratory failure.

If the dose is sufficiently large the blood is involved and the corpuscles rapidly break down.

Therapeutics.—Salicylic acid, owing to its close resemblance to quinine, was first introduced as an antiperiodic and antipyretic, but soon was found to be of inferior value in these states and of superlative value in *rheumatism*. At present, it is never used for either of the former purposes, but is largely employed as a standard remedy for the latter trouble.

The value of salicylic acid in rheumatism limits itself solely to the relief of pain and the cure of the malady without preventing the complications incident to its course. That is to say, the changes in the joints or heart are only of less frequency, because the drug shortens the disease, and not because it prevents these changes by a direct influence; this is also seen in *rheumatic hyperpyrexia*, where salicylic acid is of service, but often fails to control the temperature to any great extent. In *acute rheumatism* 10 to 15 grains should be given hourly, or every two hours, until marked physiological symptoms occur. It is to be remembered that in many cases the salicylates are of no value whatever, merely producing sweats and headaches, and it is also worthy of note that nothing else does these cases much good, as they seem bound to run a given course before the patient recovers. If a cure does take place relapses are very common indeed, and the drug should be continued for several days after all symptoms cease. In *gonorrhœal rheumatism* the drug is of little value until the gonorrhœa is cured, when the rheumatism also ceases, whether we give salicylates or not. In *rheumatoid arthritis* it is entirely valueless, and the same statement is true in regard to gout. In *chronic rheumatism* citrate of potassium and sodium may be used in place of the salicylic acid, in the dose of 30 to 60 grains, and these salts are to be taken just before going to bed. In *lumbago, sciatica*, and similar states, salicylic acid is a very useful remedy. While it is not as good as antipyrine in *neuralgia*, it is of great service in the *migraine* of rheumatic persons, often entirely curing the disease.

In *quinsy* or true *tonsillitis* the drug is a specific, particularly when rheumatism is the cause. It will generally prevent suppuration, shorten the attack, and relieve the pain and swelling. The doses should be small, and given hourly, say 3 grains. In *stomatitis*, after the blisters have broken, the burning and pain are often intense, and a mouth wash of salicylic acid in the proportion of 1 to 250 ot water is useful.

Ringer recommends the use of the following salve in *pruritus* ot the anus and vulva.

℞.—Acid. salicylic.	ʒ ij.
Ol. theobromæ	℥ v.
Cetaceæ	ʒ iij.
Ol. myristicæ	f ʒ iss.

In the treatment of *corns* there is probably no better application than lint soaked in a solution of salicylic acid or the use of the following formula:—

℞.—Acid. salicylic.	gr. xxx.
Ext. Cannabis Indicæ	gr. v.
Collodion	f ℥ ss.

S. Apply with a brush until a good coat is present.

A solution of salicylate of sodium or of bicarbonate of sodium, applied on lint to *inflamed rheumatic joints*, often gives great relief.

In *gastric dilatation* or *catarrh*, where vomiting occurs, and the matters vomited contain *sarcinæ*, salicylic acid will be found of service, and Bartholow thinks it of value in paroxysmal *gastralgia*. In cases suffering from *ascaris lumbricoides* or *round worms*, it may be used in the dose of 8 grains every hour till 40 grains are used. For thread or seat worms the following injection will be found of service:—

℞.—Acid. salicylic.	ʒ ss.
Sodii biborat.	ʒ ss.
Aquæ	Oj.

M.—S. Warm and inject into the bowels. For a child reduce this one-half in all its parts.

In *bromidrosis* of the feet (excessive sweating with fetor) salicylic acid may be dusted over the parts, or the following powder used:—

℞.—Acid salicylic. }
Amyl. pulv. } . . . . . . āā ℥ss.
M.—S. Apply to the feet.

In *eczema* of the face and hands, where the eczema is of the wet or weeping variety, salicylic acid, locally applied, is of great service.

Antiseptic Use.—Salicylic acid is employed as an antiseptic in the treatment of wounds, as a local remedy and as a dressing, but should not be applied over too large an area, as it may be absorbed, and produce constitutional symptoms. As an application to small burns, a mixture of 1 drachm of salicylic acid to 8 ounces of olive oil is of service. Salicylic acid may be added to urine to keep it sweet, but will sometimes cause the tests for sugar to appear. Patients taking salicylic acid often notice that the urine is odorless after standing, and that it will remain fresh for many days.

Untoward Effects.—Salicylic acid as already stated may produce headache and roaring in the ears. In persons with middle ear disease it is contraindicated unless urgently called for, as it often makes the deafness permanently worse. Sometimes erythema or acne follows its employment, and blindness and retinal hæmorrhages have been found. It would be impossible to enumerate all the untoward effects which have been noted, but it is worthy of remark that very few deaths have occurred.[1]

Administration.—Salicylic acid has a nauseous, disagreeable taste and is irritant to the stomach. It should be given in a solution of glycerin and water, or its taste may be covered by the use of syrup of bitter orange-peel or syrup of ginger. The following formulæ may be used:

℞.—Acid. salicylic. . . . . ℥ss.
Tinc. lavandulæ comp. . . . . . . fʒiv.
Glycerinæ . . . . f℥ss.
Aquæ . . . . q. s. fʒviij.
M.—S. A tablespoonful every 2 hours, or

℞.—Acid. salicylic. . . . . ℥ss.
Glycerinæ . . . . f℥ss.
Syrup. aurantii cort. . . . . . . f℥iv.
Aquæ. . . . . q. s. f℥viij.
M.—S. A tablespoonful every 2 hours.

Salicylic acid may be used in pill or capsule, but is irritant to the stomach in so concentrated a form; it must be taken with much water, and should follow rather than precede meals. Salicylic acid ointment (*Unguentum Acidi Salicylici, B. P.*) is a useful preparation for external application in chronic deep-seated skin diseases.

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[1] See my essay on Antipyretics.

Salicylate of Sodium.

Salicylate of Sodium (*Sodii Salicylas, U. S.* and *B. P.*) is used as a less irritant and somewhat less disagreeable preparation than salicylic acid. Its action, doses, and use are the same as the acid.

Other salicylates are largely used by some persons. Salicylate of Lithium is supposed by some physicians to be of more value than the other salts.

If buzzing in the ears is annoying, bromide of sodium in the dose of 20 grains will generally give relief.

o not use; bec. renal ease + uraemia

SALOL.

Salol is a mixture of 60 parts of salicylic acid and 40 of carbolic acid, and is decomposed by the pancreatic juice into these two substances. For this reason overdoses will give symptoms of carbolic acid poisoning. Thus 20 grains five times a day, will cause a man to take 40 grains of carbolic acid, which is almost a poisonous dose.

Salol is used for the same purposes as salicylic acid, when the stomach is irritated and cannot bear the latter drug, as it is dissolved in the gut. The dose often used is 10 grains an hour, but this is too much and may produce dangerous symptoms. It may be given in wafers, capsules, or compressed pills. It is said to be of value in *duodenal catarrh* and *catarrhal jaundice.*

SANDALWOOD.

Sandalwood (*Santalum Rubrum, U. S.*), or Red Saunders, is the wood of the *Pterocarpus Santalinus*, a tree of India and the Sandwich and Feejee Islands. It is known under the name of *Pterocarpi Lignum* in the *B. P.* From it is derived an oil (*Oleum Santali, U. S.* and *B. P.*) which has a hot, burning taste. The odor is very pleasant and it has been used as a perfume. In overdose it is capable of producing great irritation of the genito-urinary passages.

Therapeutics.—The oil of sandalwood, often called erroneously the "oil of yellow sandalwood" is much used by genito-urinary surgeons in *chronic gonorrhœa* and *gleet* for the purpose of stimulating depraved mucous membranes and in *chronic cystitis* to act as a tonic to the bladder.

In the subacute or later stages of *bronchitis*, when the expectoration is thick and ropy and the cold is not readily "thrown off," the oil of sandalwood is a most efficacious remedy. In all cases it should be given in capsules in the dose of 5 to 20 drops, 5 drops being generally sufficient. It may irritate the stomach but it is not so apt to do so as cubebs or copaiba.

SANGUINARIA.

Sanguinaria, U. S., or Blood Root, is the rhizome of *Sanguinaria Canadensis*, and has been largely used in medicine, but is a dangerous remedy, possessing more power for harm than good. Its chief alkaloid is sanguinarine.

Poisoning.—Sanguinarine in poisonous dose causes vomiting, purging, profuse salivation, and finally clonic convulsions which are spinal in origin. Death is due to respiratory failure, but the circulation is much decreased in force and frequency.

Therapeutics.—The employment of sanguinaria in *chronic bronchitis* is about the only purpose for which it is now employed to any extent. As an emetic in *croup* it has been largely used but is too irritant and depressant and ought not to be so employed. According to Bartholow, the drug acts as an *hepatic stimulant* and is of service in *gastro-intestinal catarrh* with *jaundice*.

Administration.—The dose of the fluid extract (*Extractum Sanguinariæ Fluidum, U. S.*) is 1 to 5 drops as an expectorant, or 10 to 30 drops as an emetic. If it does not act in emetic dose it must not be allowed to remain in the stomach. The tincture (*Tinctura Sanguinariæ, U. S.*) is the best preparation for use, and may be given in 20 to 30 drop doses as an expectorant, and 1 to 3 drachms as an emetic. The vinegar (*Acetum Sanguinariæ, U. S.*) is given in the dose of 10 to 30 drops, and as an emetic in the dose of 2 to 4 drachms.

SANTONIN, OR SANTONINIC ACID.

Santoninum, U. S. and *B. P.*, is an alkaloid derived from Levant worm-seed or Santonica, which is the unexpanded flower-heads of *Artemisia Maritima*, a plant of Asia Minor and Turkestan. Santonin is soluble in alcohol and chloroform, but less so in water.

Poisoning.—Santonin causes muscular tremors, convulsive movements, unconsciousness, and sometimes epileptiform convulsions.

One of the most common symptoms of the poisoning is chromatopsia or xanthopsia, during which all objects look yellow. This is due to the staining of the humors of the eye by the drug. It may go on to total blindness, or pass away in a few days. If the color is not yellow, it may be green. The urine is also stained; first yellow, then saffron, and, finally, purple-red, or is bloody looking.

This is not due to the presence of blood, but to the drug. Poisonous doses of the drug do *not* cause gastro-enteritis.

Therapeutics.—Santonin is used for the treatment of *round-worm*, and is very efficacious. It has no influence on the tape-worm. It should be given in the manner of all vermifuges (see Worms), namely, at a time when the stomach is empty. Santonin is said to have a distinct influence over vision, increasing, in medicinal amount, its acuity whenever the optic nerve is at fault. In *urinary incontinence* santonin will often produce cure after all other remedies fail.

Santoninate of Sodium (*Sodii Santoninas, U. S.*) is a useless, harmful preparation, never to be employed except for the benefit of the eye when vision fails through disease of the optic nerve. Introduced into medicine because of its solubility, it does just what is least desired in treating worms, namely, is absorbed into the system, leaving the worm in peace in its resting-place. In eye affections the dose may be from 2 to 8 grains, according to the age of the adult.

Santonin may also be given in the dose of 1 to 2 grains to an adult in capsules or wafers. The crystals should be used, not the powdered santonin. If the bowels are not opened within ten hours after the drug is used, a saline purge should be given, preceded preferably by a 2 or 3 grain dose of calomel, taken half an hour before.

Administration.—Santonin is best given in the form of a troche or lozenge (*Trochisci Santonini, B. P.*), but it is to be distinctly borne in mind, and written on the prescription, that the *Trochisci Sodii Santoninatis, U. S.*, are not sold to the patient. The troches of santonin itself are not officinal in the *U. S. P.*, and it is better for the physician to write for them as follows:

℞.—Santonin	gr. v.
Pulv. sac. alb.	ʒiij.
Pulv. acaciæ	gr. viij.
Mix thoroughly, and add	
Acaciæ mucilag.	gtt. xvj.
Aquæ	q. s.

To be divided in troches No. x.—S. 1 or 2 lozenges, as directed.

SARSAPARILLA.

Sarsaparilla, U. S., is the root of *Smilax Officinalis, Medica,* and other species of smilax growing chiefly in Central America, it is known in the B. P. as *Sarsæ Radix.* The drug is largely devoid of any physiological action, yet seems to possess some power over the general condition of the system. Thus while sarsaparilla seems utterly without effect in the hands of most physicians when given alone, it often seems to do good and to increase the effects of other drugs when combined with them, so that some cases of syphilis which are of an obstinate character, will yield to iodide of potassium and sarsaparilla when the iodide alone fails. It is largely used in domestic medicine as a "blood purifier," and is a prominent constituent of many patent medicines.

Administration.—Sarsaparilla is most commonly given in the form of the compound syrup (*Syrupus Sarsaparillæ Compositum, U. S.*), composed of sarsaparilla, sassafras, guaiacum wood, liquorice, pale rose, anise, and mezereum, dose 1 to 4 fluidrachms. The other officinal preparations of the *U. S. P.* are the compound decoction (*Decoctum Sarsaparillæ Compositum*), composed of the same principal ingredients as the compound syrup, except anise, senna, and pale rose, dose 4 to 6 fluidrachms; the compound fluid extract (*Extractum Sarsaparillæ Compositum Fluidum*), similar to the syrup in composition, dose of ½ to 1 fluidrachm; and the fluid extract (*Extractum Sarsaparillæ Fluidum*), dose ½ to 1 fluidrachm. The *B. P.* preparations are a decoction (*Decoctum Sarsæ*), dose 2 to 10 fluidounces; a compound decoction (*Decoctum Sarsæ Compositum*), which is the same as the decoction of the *U. S. P.*; a liquid extract (*Extractum Sarsæ Liquidum*), dose ½ to 4 fluidrachms.

SAVINE.

Sabina, U. S., Savinæ Cacumina, B. P., is the tops of the *Juniperus Sabina*, an evergreen shrub of northern Europe, Asia, and America. It contains an officinal volatile oil (*Oleum Sabinæ, U. S.* and *B. P.*). Locally applied it is more of a counter-irritant than is turpentine, and if swallowed in poisonous amount causes nausea, vomiting, gastro-enteritis, unconsciousness, suppression of urine, and death. If the individual be a pregnant female abortion takes place as death approaches, but very rarely before this time. Profuse flooding nearly always accompanies the act.

Therapeutics.—The oil taken in the dose of 5 to 10 drops, repeated every three or four hours, acts as a powerful stimulant to the uterus and ovaries, causing hyperæmia and aiding in the production of menstruation in *amenorrhœa,* and in adding tone to the parts in *menorrhagia;* it is best given in emulsion or capsule. The fluid extract (*Extractum Sabinæ Fluidum, U. S.*) is given in the dose of 5 to 15 minims; the tincture (*Tinctura Sabinæ, B. P.*) in the dose of 20 minims to 1 drachm. The ointment (*Unguentum Sabinæ, B. P.*) is used as an external irritant.

SCAMMONY.

Scammonium, U. S. and *B. P.*, is a resinous exudate from the root of *Convolvulus Scammonia*, growing in Asia Minor and Syria. Its active principle is sometimes called jalapin.

Therapeutics.—Scammony is an irritant, drastic, hydragogue purge, causing a good deal of griping, and exerting a chologogue effect. If any inflammatory action of the bowels is present it is contra-indicated.

Poisonous doses are to be followed by treatment suitable to gastroenteritis. Scammony is given in the dose of 2 to 5 grains, always in combination with some other similar drug, as, for example, colocynth when it forms part of the compound extract of colocynth (*Extractum Colocynthidis Compositum, U. S.*), dose 1 to 3 grains as a laxative, or 5 to 20 grains as a purge. The resin (*Resina Scammonii, U. S.* and *B. P.*) is given in the dose of 3 to 8 grains. The *B. P.* preparations of scammony are *Mistura Scammonii*, dose ½ to 2 ounces; *Confectio Scammonii*, dose 10 to 30 grains; *Pilula Scammonii Composita*, dose 5 grains; and *Pulvis Scammonii Compositus*, dose 10 to 20 grains. The last two preparations are composed of scammony, ginger, and jalap.

SCOPARIUS AND SPARTEINE.

Scoparius, U. S., Scopari Cacumina, B. P., or Broom, is the tops of the *Sarothamnus Scoparius*. It contains scoparin and sparteine, the first being a crystalline principle, and the second a liquid alkaloid. The second (sparteine) is the alkaloid used in medicine in the form of a sulphate.

Physiological Action.—As scoparius depends for its medicinal value almost entirely upon sparteine, what is here said applies to both the drug itself and the alkaloid.

NERVOUS SYSTEM.—Sparteine acts on the nervous system very decidedly if given in large dose, depressing the brain and spinal cord, chiefly in its motor tracts, thereby causing a decrease of reflex action and motor power, ending in complete paralysis. This occurs both in man and in the lower animals. The heart is said to be stopped in systole.

CIRCULATION.—Upon the circulation sparteine acts as a stimulant. It quickens the pulse rate in moderate doses, and also raises arterial pressure. The force of the contraction of the ventricles is also increased. In very large poisonous doses the drug acts as a circulatory depressant.

RESPIRATION.—Upon this function in small amounts it has no effect, but poisonous doses kill by paralysis of the respiratory centre.

Poisoning.—The symptoms of poisoning consist in trembling and incoördination of movement, clonic and tonic convulsions, followed by a second stage of depression of the nervous system and general enfeeblement.

Therapeutics.—Sparteine has been recommended in all states of the heart where digitalis is of service, and it is stated that it is serviceable in those fairly frequent cases where digitalis fails. In *cardiac arhythmia* or *palpitation*, it is thought to be of great service by those who have used it most. Clark found it of value in *Graves's disease* and in nearly every circulatory abnormality, but in the judgment of the author of this book sparteine is generally a useless drug to be resorted to as a last resource after more generally known remedies fail, and it is not a remedy to be used as a "standby" in the manner in which digitalis is employed.

While some clinicians have found it of value, many of them have not. In the few cases in which it has been used by the writer it entirely failed to be of value. The dose is as variable as its action. Some state it to be $\frac{1}{20}$ of a grain, while still others recommend 2 to 4 grains. A small dose should be used at first, and rapidly increased until effects ensue. The drug should be given in watery solution.

Scoparius itself is used in decoction, made by adding half an ounce of the broom tops to a pint of water, and boiling them down to a half pint. Of this, an ounce should be taken every three hours. This decoction is one of the most efficient diuretics in *cardiac dropsy*. An unofficinal fluid extract is given in the dose of 30 drops. The officinal preparations of the *B. P.* are a decoction (*Decoctum Scoparii*), dose 1 to 3 ounces, and the juice of *Succus Scoparii*, dose 1 to 2 drachms.

SEIDLITZ POWDER.

Under the officinal name of *Pulvis Effervescens Compositus* the *U. S. P.* recognizes a purgative powder made by taking the bitartrate of sodium and potassium or Rochelle salt 120 grains and bicarbonate of sodium 40 grains, which are wrapped in blue paper, and 35 grains of tartaric acid placed in a second paper. The contents of each paper are dissolved in a little water—half a tumblerful, and the two solutions added to one another and swallowed during effervescence. As much as two powders may be used but this is generally too large an amount. In *sick stomach* with *constipation* where a whole powder cannot be retained, the two powders should be divided in fourths and a fourth added to a fourth in a half wineglassful of water and taken every 15 minutes until the entire powder is ingested. This will often settle the stomach and produce purgation.

SENEGA.

Senega, U. S., Senegæ Radix, B. P., is the root of *Polygala Senega*, a small plant of the United States, containing a principle known as polygalic acid and senegin.

Therapeutics.—Senega is used in medicine as a stimulating expectorant in the sub-acute and chronic forms of *bronchitis*. It has also been employed as a diuretic in *cardiac dropsy* or that due to renal disease. In cardiac disease it should not be used, and indeed it is rarely employed at present except in combination with other drugs in expectorant mixtures.

Administration.—Senega is used in the form of the abstract (*Abstractum Senegæ, U. S.*), dose 5 to 10 grains, the fluid extract (*Extractum Senegæ Fluidum, U. S.*), dose 10 to 20 drops, and the syrup (*Syrupus Senegæ, U. S.*), dose 1 to 2 drachms. It is also used in Coxe's Hive Syrup. The officinal preparations of the *B. P.* are a tincture (*Tinctura Senegæ*), dose 1 to 2 drachms, and an infusion (*Infusum Senegæ*), dose 4 to 2 ounces.

SENNA.

Senna, U. S., is the most drastic of the laxative purges used for the relief of *constipation*. It is the leaflets of *Cassia Acutifolia* and *Cassia Elongata* and contains a very acrid irritant purgative principle known as cathartic acid. Senna is officinal in the *B. P.* as *Senna Indica* and *Alexandrina*.

Physiological Action.—Senna acts as a purge, producing copious stools, often with a great deal of griping if it is used alone. According to Rutherford and Vignal, it acts very materially in increasing the flow of bile, but it is seldom used in medicine as a cholagogue.

According to Prevost and Binet, cathartic acid has an influence over biliary secretion. Hess has found that the drug acts directly upon the mucous membranes and so produces a local peristalsis as it is moved along. It is also known that the drug acts as a purge when absorbed from the skin, and nursing mothers must not take senna as it will purge the nursling.

Administration.—Senna is generally combined with other drugs in constipation but may be used alone.

If this is done the fluid extract (*Extractum Sennæ Fluidum, U. S.*) may be employed in the dose of 1 to 2 drachms to a child or 4 drachms to an adult, or if the child is "set against" medicine, the more agreeable confection (*Confectio Sennæ, U. S.* and *B. P.*) should be used, in the dose of ½ drachm to a child, or 1 to 2 drachms to an adult. As the confection is apt to cause dyspepsia, its use is limited to a certain class of cases.

In the *constipation of pregnancy* senna is thought to be very useful. Under the name of Black Draught a mixture of senna, manna, and sulphate of magnesium has been largely used (*Infusum Sennæ Compositum, U. S.*), in the dose of 4 ounces. It is an active hydragogue purge. The syrup (*Syrupus Sennæ, U. S.* and *B. P.*) is given in the dose of 1 to 4 drachms.

One of the best ways to use senna is in the compound liquorice powder (*Pulvis Glycyrrhizæ Compositus, U. S.* and *B. P.*), which is a good laxative in the dose of 20 to 30 grains.

Infusum Sennæ, B. P., is given in the dose of 1 to 2 ounces; *Mistura Sennæ Composita, B. P.*, in the dose of 1 to 2 ounces, and *Tinctura Sennæ, B. P.*, in the dose of 1 to 4 drachms.

Senna may stain the urine red and no alarm should be felt if this color appears in this secretion.

SERPENTARIA.

Serpentaria, U. S., Serpentaria Rhizoma, B. P., or Virginia Snake Root, is the rhizome and rootlets of *Aristolochia serpentaria* and *Aristolochia reticulata*, plants of the southern United States. It contains an active principle, Aristochine, which is never used in medicine.

Therapeutics.—Owing to the rather pleasant, warm taste of serpentaria, and the fact that it acts upon secretion, it is used largely as a vehicle for other more potent remedies. It has tonic properties and has been largely used in atonic dyspepsia and indigestion. It is even said to be a sexual stimulant but this is doubtful to say the least. In overdose it is irritant and will cause vomiting and purging.

Administration.—Serpentaria is given in the form of the extract (*Extractum Serpentaria Fluidum, U. S.*), in the dose of 10 to 40 drops and the tincture (*Tinctura Serpentaria, U. S.* and *B. P.*), in the dose of ½ to 2 drachms. It also enters into Huxham's tincture of cinchona (*Tinctura Cinchonæ Composita, U. S.* and *B. P.*). *Infusum Serpentariæ, B. P.* is given in the dose of 1 to 2 ounces.

SILICATE OF POTASSIUM.

Soluble Glass occurs as a clear syrupy fluid, and is not officinal. It is used as a dressing for *fractures* and *sprains*, rapidly becoming hard and immovable when painted over the bandages. It may be substituted for the plaster-of-Paris.

SOAP.

Sapo, U. S., Sapo Duris, B. P., is prepared from any alkali and fixed oil, although soda and olive oil are most frequently employed for medicinally used soaps. Castile soap, if good, is the best representative of a pure medicinal soap that we have.

Soap may be cut into the form of a suppository for provoking passages in constipation in children, by placing it just inside the anus, having previously dipped it into water one instant to make it slippery. It may also be used as an enema, dissolved in warm water, or a mixture known in Philadelphia as the "House mixture" may be employed. This consists of a mixture of water, soft soap, and molasses in varying proportions, or, if there is *flatulence*, turpentine and olive oil are added to it. This preparation is as efficient as it is cheap and dirty. Soap is also used as an antidote to many poisons and as aid to emetics.

Green Soap (*Sapo Viridis, U. S., Sapo Mollis, B. P.*) is not generally green but brown. It is a soft soap made by the use of potash and olive oil and largely used by dermatologists in the treatment of *eczema* and similar skin diseases where a detergent, stimulating application is needed. It is sometimes called "German soft-soap" to separate it from ordinary soft-soap, or sapo mollis. Green soap is not commonly employed as green soap, but in the tincture (*Tinctura Saponis Viridis, U. S.*), which is to be thoroughly rubbed into the part and afterward well washed off and simple cerate or some other soothing salve applied.

Soap Liniment (*Linimentum Saponis, U. S.* and *B. P.*), or Opodeldoc as it is called in domestic medicine, is largely used for rubbing *stiff muscles* and *sprains*. It is generally used to carry more active external remedies, such as opium or aconite.

Soap Plaster (*Emplastrum Saponis, U. S.*) is used as a thick, heavy protective in *bed-sores* or where bed-sores are feared. It is also used as a support about *sprained joints*.

SODIUM.

Sodium is a non-metallic element, the salts of which are usually white and colorless. It is not used in medicine, but many of its salts are employed. Unlike the potassium salts, it seems to exert comparatively little effect on the animal economy. The salts vary in their power with the acid forming them. (For the salts, see the names of the acids, as Chloride of Sodium, etc.)

Acetate of Sodium (*Sodii Acetas, U. S.* and *B. P.*) is rarely if ever used in medicine as a substitute for acetate of potassium. Its dose is 20 to 40 grains three times a day.

SODIUM ETHYLATE.

Sodium Ethylate is a whitish powder decomposed in the presence of water into alcohol and caustic soda, but soluble in absolute alcohol without decomposition.

Sodium ethylate is employed in medicine as a depilatory—that is, for the purpose of removing hairy growths. To accomplish this purpose it is necessary that the growth be clipped close to the skin, and that the drug be dissolved in absolute alcohol and applied over the roots of the hair with a glass rod.

Soon after this application a crust forms, which should not be detached for two or three weeks, but which, on its removal at the end of this time, generally shows that all of the hair has been destroyed. If not, the operation may be repeated as soon as the skin is in a condition to stand it. To relieve pain a five per cent. solution of cocaine may be applied, and it is worthy of remembrance that moles and small birth-marks, or nævi, may be relieved by a similar application.

SOMNAL.

Somnal is stated to be ethylated chloral-urethan, and seems to possess marked hypnotic power. It is a clear, colorless liquid of a hot, burning taste, resembling sweet spirit of nitre. The dose is 20 to 40 drops in licorice-water or syrup of raspberry, and the sleep produced by it is said to last seven to eight hours. The remedy is so very new that no definite reports have yet been made of it.

SOZOIODOL.

Sozoiodol differs in one respect from other antiseptics, so far as our patriotism is concerned, in that it was first made and employed by one of our own countrymen in San Francisco, but at that time the preparation of it was so imperfectly carried out that foreign matters made it too irritating for general use, and it was discarded, only to be better prepared and more widely used in Germany some years later.

Therapeutics.—Sozoiodol has been found of value as an antiseptic and disinfectant in *wounds* which are in a diseased state, and in *acute stomatitis* and *pharyngeal catarrh* it may be employed locally in the form of a five per cent. watery solution. It has also been found useful in *acute purulent conjunctivitis*, and in *ophthalmia neonatorum*, in the proportion of two parts of sozoiodol to thirty parts of water. In *urethritis*, of a specific type, we may employ the preparation known as zinc-sozoiodol in a 2 per cent. solution with advantage, and it is of value in mild and malignant *vaginitis* if preceded by an application of pyroligneous acetic acid or nitrate of silver, by means of a speculum.

In the treatment of gynecological cases, particularly in *catarrh of the cervix uteri*, Nitschman uses sozoiodol in the form of a powder applied by means of a tampon with good results, and it would seem as being worth a trial in many other states of the mucous membranes than those just named.

SPIGELIA.

Spigelia, *U. S.*, Pinkroot, is the root and rhizome of *Spigelia Marilandica*, or Carolina Pink, a plant of the southern United States.

Poisoning.—Almost immediately after the ingestion of a poisonous dose the animal has short and quick expiratory movements, amounting almost to a cough.[1] Soon after the pupils become widely dilated, and at the same time very fixed in this position so that they cannot follow any object, such as a pencil, when it is moved from side to side. Constant retching, with no result, now comes on, the animal standing and apparently suffering from no sensory or motor palsy. There is no change in gait. Soon after this marked exophthalmia develops itself. The retching, having lasted about five minutes, now passes off, and at this time signs of muscular weakness and lack of coördination appear and the walk becomes staggering both in the fore and hind legs. The respirations now become very rapid, resembling those of a dog after a long, hot run. The tongue hangs from the mouth and is dry and red, and the nose is hot and no longer moist. Muscular power is progressively lost, so that the dog frequently falls when endeavoring to walk, but sensation does not seem to be affected. About this period the animal lies down and passes into a deep sleep, which, in turn, soon changes into coma, and death follows without any movement being made, evidently from a general failure of vital force. The respirations, as death approaches, become slow, and are finally extinguished simultaneously with cardiac arrest. The palsy is spinal in origin, the motor and sensory nerve-trunks and the muscles escaping.

Therapeutics.—Spigelia is one of the most efficient remedies in the treatment of *round-worms*, and is not dangerous when given with care. When employed the usual care should be taken in regard to food (see Worms), and it should be followed by a purge to sweep out the worm while it is narcotized by the drug. The purge should be a rapidly-acting one, such as sulphate of magnesium.

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[1] See investigation by author in The Medical News, March 12, 1887.

Administration.—The dose of spigelia, in the form of the fluid extract (*Extractum Spigeliæ Fluidum, U. S.*), is 2 drachms; that of the unofficinal fluid extract of spigelia and senna (*Extractum Spigelia et Sennæ Fluidum*) is ½ to 1 drachm for a child of two years of age; ½ an ounce is the dose for an adult. This extract with senna makes the drug more efficient, and it is generally liked by children. It is to be remembered it is not officinal.

SQUILL.

Scilla, U. S. and *B. P.*, is the sliced bulb of *Urginea Scilla* or *Scilla Maritima*, a plant of the countries bordering on the Mediterranean. It contains Scillin, Scillipikrin and Scillitoxin, and all of which possess poisonous properties and none of which are used in medicine alone, except by a few persons.

Poisoning.—In poisonous doses squill produces vomiting, purging, dulness, stupor, intermittent palsy, convulsions, and death in ten to twenty hours. This is preceded by a great fall in temperature. The urine is suppressed or bloody and acute nephritis is set up. Gastroenteritis may be marked.

Therapeutics.—Squill is largely used as a stimulant or irritant diuretic, not to affect the renal epithelium directly and promote secretion, but rather to tone up and excite to normal effort a kidney depressed by disease as in very *chronic Bright's Disease* or congestion from cardiac trouble. In *cardiac dropsy* combined with digitalis it is a standard and much used remedy, and is undoubtedly of value in aiding in the absorption of *effusions into the pericardium, pleura,* and *abdomen.* Squill is usually given in *dropsy* in pill form as follows:

℞.—Pulv. scillæ. . . . . gr.x.
Pulv. digital. fol. . . . . gr.xx.
M.—Ft. in Pil. No. x. S. One t. d. after meals.

The employment of squill in *bronchitis*, although largely resorted to, is not a very good practice since its irritant action on the kidneys and stomach may cause trouble. The period for its administration is the second stage when secretion is scanty or so excessive as to need proper stimulation of the mucous membranes to bring on a healthy action. Sometimes Coxe's Hive Syrup is used, either as an emetic in drachm doses every ten minutes until it acts, or as an expectorant in the dose of 30 drops to a drachm for an adult. As it contains antimony it should be given with care.

Administration.—The fluid extract (*Extractum Scillæ Fluidum, U. S.*) is given in the dose of 1 to 5 drops; the tincture (*Tinctura Scillæ, U. S.* and *B. P.*), in the dose of 5 to 30 drops; the vinegar of squill (*Acetum Scillæ, U. S.* and *B. P.*), in the dose of 10 drops to ½ drachm. The compound syrup (*Syrupus Scillæ Compositus, U. S.*), or Coxe's Hive Syrup, is composed of squill, tartrate of antimony and potassium, precipitated phosphate of calcium, alcohol, sugar, and water, and is given in the dose of 20 drops to a drachm.

The following will be found useful in bronchitis of the subacute stage.

℞.—Vin. ipecac. . . . . fʒj.
Tinc. scillæ . . . . fʒij.
Syr. tolutan. . . . . f℥v.
Aquæ. . . . . f℥j.
M.—S. Teaspoonful every 3 or 4 hours.

The plain syrup (*Syrupus Scillæ, U. S.* and *B. P.*) is given in the dose of ½ to 1 drachm; the honey (*Oxymel Scillæ, B. P.*), in the dose of ½ to 1 drachm, and the compound pill (*Pilula Scillæ Composita, B. P.*) in the dose of 5 to 10 grains.

STILLINGIA.

Stillingia, U. S., Queen's Root, is the root of *Stillingia Sylvatica*, a plant of the United States, the active principle of which is stillingin.

Physiological Action.—There can be no doubt that this drug acts in two ways. First, by its immediate effects on the system; and, second, by its more slowly shown influences. In overdose it causes bilious purging, increased heart action, and active secretion from the bronchial mucous membrane.

Therapeutics.—Stillingia is highly recommended in habitual constipation, as it increases intestinal secretion, and it is even said to act as a specific in hemorrhoids dependent largely for their existence upon hepatic engorgement and intestinal atony.

Bartholow recommends the following prescription under these circumstances:

℞.—Extract stillingiæ fluid. . . . . . fʒv.
Tinc. belladonnæ }
Tinc. nucis vomicæ } . . . . āā fʒj.
Tinc. physostigmatis }
M.—S. 20 drops in water t. d. before meals.

Tincture of aloes may also be added if necessary. In *syphilis* of an obstinate, rapid type, stillingia should be used as an aid to other drugs.

In pasty-looking, white, "putty-faced" children who are anæmic or strumous, and who never have any appetite, or are subject to middle-ear trouble and general debility, stillingia is of value. It should be used under these circumstances for some time.

The only officinal preparation is the fluid extract (*Extractum Stillingiæ Fluidum, U. S.*), the dose of which is 10 to 60 drops, which should always be made of the fresh root.

STRAMONIUM.

Jamestown Weed, or *Datura Stramonium*, is officinal in the form of the leaves (*Stramonii Folia, U. S.*) and seeds (*Stramonii Semen, U. S.* and *B. P.*). It contains an alkaloid known as daturine, which is physiologically identical with atropine.

Physiological Action.—(See Belladonna.)

Therapeutics.—The uses of stramonium are identical with those of belladonna.

Administration.—The extract (*Extractum Stramonii, U. S.* and *B. P.*) is used in the dose of $\frac{1}{8}$ to $\frac{1}{2}$ grain, the fluid extract (*Extractum Stramonii Fluidum, U. S.*) in the dose of 1 to 5 drops, the tincture (*Tinctura Stramonii, U. S.* and *B. P.*) in the dose of 5 to 30 drops. The ointment (*Unguentum Stramonii, U. S.*) is used as is belladonna ointment. The dose of daturine is $\frac{1}{120}$ to $\frac{1}{80}$ of a grain.

STROPHANTHUS.

The seeds of *Strophanthus Hispidus*, an African plant from which the natives make Kombé arrow poison. There are many varieties of strophanthus. The active principle is strophanthin, from which is derived strophanthidin.

Therapeutics.—Strophanthin may be used in all forms of *cardiac disease* to supplant digitalis, but it is not its equal.

From the cases of cardiac disease seen frequently by the writer he has reached the conclusion that digitalis gives relief to patients under the age of twelve years in a much smaller proportion of cases than it does in adults, and that though the stomach is no more frequently disordered, increased dyspnœa, nervous irritability, and cyanosis often follow its use.

As every one knows, there are a certain number of cases where digitalis seems to do harm in adults, the explanation being that under such circumstances the ventricle is so overstimulated that the auricle cannot empty itself thoroughly, and becomes congested in consequence.

Strophanthus acts exceedingly well in these instances where digitalis fails, and this is particularly true in adults. It will relieve *cardiac dropsy* by its action on the heart, but it is not diuretic in itself.

Administration.—Strophanthus is given in the form of the tincture in the dose of 3 to 6 drops three times a day. Strophanthin may be given hypodermically in the dose of $\frac{1}{100}$ to $\frac{1}{50}$ of a grain. Its effects, when so used, are said to last a week, but this is not likely.

SUGAR.

Saccharum, U. S., Saccharum Purificatum, B. P., is the refined sugar of *Saccharum Officinarum*, or Sugar Cane, it is also obtained from the sugar beet. It is an anti-putrefactive but not an anti-fermentative. Mixed with iron preparations it prevents oxidation. As it is a hydro-carbon it is a nutrient and developer of adipose tissue, or, in other words, a food. Its use is contra-indicated in obesity, during the presence of fermentative changes in the intestine, and in diabetes mellitus.

SUGAR OF MILK.

Saccharum Lactis, U. S. and *B. P.*, is derived from the whey of cow's milk, in the proportion of about 5 per cent., by evaporation and purified by re-crystallization. It has little sweetening power compared to cane sugar and possesses a peculiar flat taste. It is, however, less apt to ferment and is better for infants than is cane sugar.

Milk sugar is largely used in triturations because by its hardness it aids in the subdivision of the medicament. It is also used to increase bulk in small powders, where such drugs as podophyllin are prescribed.

SULPHATE OF ZINC.

Zinci Sulphas, U. S. and *B. P.*, is a white, somewhat efflorescent salt, and of sharp acid taste, soluble in water. In large amounts it acts as an irritant, and is widely employed as an irritant peripheral emetic in the dose of 10 to 30 grains. It is not so severe as sulphate of copper in its poisonous properties and may be repeated if the first dose does not produce vomiting. In weak solutions it may be used as an astringent application in *gonorrhœa* and other affections of the mucous membrane. In 2 grain pills it is sometimes given in *serous diarrhœas*, particularly if it be combined with opium or minute doses of podophyllin ($\frac{1}{60}$ of a grain at a dose). In *conjunctivitis* and other eye affections the drug is used in the form of a wash. (See Conjunctivitis.)

SULPHIDES.

Baths of the various sulphides, such as are obtained at sulphur springs, are very useful in many cases of skin disease of an obstinate type, such as *psoriasis*, *lichen* and *eczema*. They are also employed in *chronic rheumatism* and *gout*.

In *laryngeal hoarseness* and *pharyngeal* affections, such as follow public speaking and exposure to cold, sulphides or sulphur waters are very useful, and little doubt exists but that their employment is one of the best ways to cure the obstinate state of the throat sometimes seen in public speakers.

As was first noted by Dr. Ringer, the sulphides, particularly in the form of calcium sulphide, are very useful in all cases where pus is about to form.

They may be employed in cases where successive crops of *boils* occur and in *adenitis* of the neck and elsewhere. If they do not stop the formation of pus they aid in its inspissation and absorption. Children should take a teaspoonful of a solution containing a grain of calcium sulphide, or calx sulphurata, to the half-pint of water every hour. Adults should use sulphide of calcium in gelatin-coated pill, dose ¼ to ½ a grain three times a day. The solution must be freshly prepared, as it undergoes oxidation and changes into a sulphate.

SULPHONAL.

Sulphonal is a synthetically prepared substance first manufactured in Germany by Baumann, and possesses the chemical name of diethylsulphon-dimethyl-methane. It is a colorless, odorless, solid substance, soluble in 100 parts of cold and 18 to 20 parts of hot water, readily soluble in alcohol and ether. The drug is not affected by any of the ordinary acids, and is very stable.

Physiological Action.—Several quite interesting researches upon this comparatively new hypnotic have been carried out during the past year. Smith, of London, has studied its action on the activity of tissue-change, and has also attempted to determine the changes in the drug during its passage through the body. In regard to the first question he found, by experimenting upon a powerful, healthy dog, weighing thirty-five pounds, which was fed upon one pound of dog-biscuit and one quart of water daily, that the amount of urea during the administration of sulphonal is a little greater than that eliminated during the period when no drug is given. He also found that the urine is slightly increased in amount under the influence of the drug. The changes were, however, so very slight that he reaches the conclusion that moderate doses of sulphonal do not affect the destruction of nitrogenous tissues. In regard to the second question Smith quotes the results of Kast, namely, that sulphonal does not pass into the urine as such, but in the form of a sulphuretted organic compound. Smith therefore directed his attention to the endeavor of finding out whether the entire amount of the drug ingested is changed or not. Without taking up space with a full consideration of his method of experimentation, we find that his conclusions may be summed up as follows: In moderate doses the drug is completely changed during its passage through the body into a sulphuretted organic substance, and the elimination of sulphuric acid is not increased by taking sulphonal. In the publication quoted Dr. Smith does not give us the exact nature of the substance derived from sulphonal, but promises to inform us further concerning it in a later contribution. Another paper upon the physiological action of sulphonal has been published by Dr. William F. Shick, of Easton, Pa., who has found, after a series of experiments, first, that sulphonal when given by the stomach acts very slowly on account of its insolubility; but that subcutaneously in warm solution it is much more active. The drug was also found to produce a general relaxation of the muscles, and a staggering gait after its hypnotic power had passed by. The spectroscope failed to show any changes in the blood. The motor nerves are not affected. Shick believes that the action of the drug is expended upon the higher nerve-centres. He also found a decreased reflex activity, and believes this lessening to be due to stimulation of Setschenow's reflex inhibitory centre. On the circulation the drug was found to have but little power. When sent directly into the blood there is produced a slight decrease in arterial pressure, followed very soon after by an increase. Upon the respiration the drug is found to act as a depressant in full doses.

Therapeutics.—Sulphonal finds its place in medicine as a somnifacient or hypnotic, valuable where nervous functional insomnia is present, useless where advanced disease, such as cardiac trouble, is responsible for the wakefulness. In insanity it often produces sleep, and is often of great service in the various mental disturbances characterized by lack of sleep and often affecting persons of unsound mind. Sulphonal may be defined very briefly by any one who has largely used it or watched the reports made of its progress. This definition is that the drug does possess sleep-producing power of moderate amount, not equal to chloral or potassium bromide, but greater than that of paraldehyde, and that it will sometimes succeed where the other hypnotics fail.

Administration.—Sulphonal being virtually insoluble in cold water is best given in large capsules or in mucilage of acacia, so as to be held in suspension until swallowed. The drug is bulky and hard to administer for these reasons. The dose is 20 to 40 grains.

SULPHUR.

Sulphur is a non-metallic element officinal in three forms in the *U. S. P.*, namely, as *Sulphur Lotum*, or washed sulphur, *Sulphur Precipitatum*, *U. S.* and *B. P.*, or precipitated sulphur, and *Sulphur Sublimatum*, or flowers of sulphur.

Physiological Action.—Sulphur has little physiological influence over the general system. When taken internally it causes a soft mushy stool of a yellow color, with a strong odor of hydrogen sulphide. The drug acts particularly on the skin and mucous membranes. The juices of the intestines break some of it up into sulphuretted hydrogen and sulphides.

Therapeutics.—Sulphur is used as a mild laxative, never purging. In *stricture of the bowels* the soft stools produced by it will often slip by the obstruction, and it is worthy of note that sulphur will sometimes relieve constipation which nothing else will give relief. It is particularly valuable in the treatment of *constipation* where there are *hæmorrhoids*, and in *chronic rheumatism* and *sciatica* it is thought by some to effect a cure.

Sulphur is of great service in the treatment of *chronic bronchial affections* but for some curious reason its use has become almost obselete. The so-called Bergeon's method of treating *phthisis* by rectal injections of carbonic acid gas loaded with sulphuretted hydrogen was simply a revival of an old knowledge possessed by our great-grandfathers who often used sulphur waters by the mouth. Bergeon took the trouble to go to the back door to accomplish what was done 200 years ago by the front door, and the only novel part of his method was his filthy way of using the drug. Graves recommended 5 to 10 grains of sulphur three times a day wherever bronchial secretion was excessive, and found that it rid the lungs of mucus and relieved the *cough*.

The external use of sulphur is very much more important than its internal use, particularly as regards affections of the skin. Of itself the drug exercises little effect when used in powdered form over the cuticle, but its combination with an ointment at once makes it active. Even irritations of the skin may ensue from its constant use in concentrated form.

In *scabies*, or *itch*, sulphur ointment (*Unguentum Sulphuris*, *U. S.* and *B. P.*) is the best remedy we have. The female parasite burrows under the epiderm and deposits the ova as she moves about while the male does not burrow but stays on the surface. The ointment will kill him, as he is readily attacked, but the female is protected by her burrowing propensities. To get at her and the ova the burrows may be opened, and this must be accomplished by a thorough soaking with soap and water, thereby softening the skin and aiding in its removal by a rough towel. The towel should be at once boiled to prevent its conveying the parasite to others. The ointment if now applied relieves the patient almost at once. It is important that the skin be well softened and rubbed, in order to open every burrow. The ointment should be allowed to remain on the part all night and be used for three or four nights consecutively.

Young females often suffer from *acne*, particularly about the menstrual epoch, the skin also becoming sallow and muddy. Ringer recommends the following lotion as one which is very successful in promoting a cure:

℞.—Sulphur sublimati	ʒj.
Glycerinæ	f℥j.
Aquæ rosæ	f℥viij.

M.—S. Apply as a wash once or twice daily.

A confection (*Confectio Sulphuris*) is officinal in the *B. P.*, dose 10 grains to 2 drachms.

SULPHIDE OF CALCIUM.

See *Calcium*, *Calx*, or *Sulphides*.

SULPHURIC ACID.

Acidum Sulphuricum, *U. S.* and *B. P.*, Sulphuric Acid, or Oil of Vitriol, is a powerful irritant and escharotic, rapidly dehydrating and carbonizing the tissues, causing them to become black. It is the most astringent of the mineral acids, and when absorbed is converted into sulphates and so eliminated by the kidneys, the lower bowel, and the skin.

Poisoning.—The symptoms produced by poisonous doses are those of a gastro-intestinal inflammation of the most severe type, or the patient may drop to the floor almost at once owing to collapse, dependent upon perforation of the walls of the œsophagus or stomach by the acid and its escape into the peritoneal cavity. If the patient lives to the fourth day the parotid glands swell, as the result of stenosis of the salivary ducts of Steno, and violent inflammation of the kidneys may appear. If partial recovery takes place the patient often dies from inanition due to the formation of strictures in the alimentary canal or to destruction of the peptic tubules. The stain about the mouth is black and if any of the acid is spilt on the clothes, its characteristic burn is to be seen.

The treatment consists in the use of alkalies, such as chalk, magnesium, whitewash off the walls, and soap. Opium and oils are to be given to ally irritation and external heat is to be applied.

Therapeutics.—Sulphuric acid is sometimes employed as a caustic to *venereal sores*, *warts*, and *slowly healing ulcers*, but is most commonly used internally as it fulfils several pressing indications. As a remedy for *serous diarrhœa*, particularly if combined with some vegetable astringent, it is unsurpassed, and its use in *cholera* deserves great attention. (See Diarrhœa.) In the Philadelphia Hospital during an epidemic of cholera some years since, every case which received it improved or failed to be attacked, whereas those who did not receive it were either very ill or died.

The proper way to use the drug as a prophylactic in cholera is in the form of "sulphuric-acid lemonade," made so that each wineglassful contains 5 drops of the aromatic sulphuric acid. The same solution should be used in acute lead-poisoning in order to form an insoluble sulphate of lead, and may be taken by artisans exposed to chronic lead-poisoning as a prophylactic for the same reason.

As sulphuric acid is eliminated by the skin it is often useful in the night-sweats of phthisis combined with belladonna or morphine.

Administration.—The dose of the dilute acid (*Acidum Sulphuricum Dilutum, U. S.* and *B. P.*) is 10 to 30 drops, and of the aromatic acid (*Acidum Sulphuricum Aromaticum, U. S.* and *B. P.*) 10 to 20 drops. The last is the best preparation. Both should be thoroughly diluted.

SUMBUL.

Sumbul, U. S., is the root of *Ferula Sumbul*, a large plant of Northern Asia. The dose of the root (*Sumbul Radix, B. P.*) is 10 to 40 grains. On the nervous system it acts as an efficient nerve tonic, and is very largely employed by Goodell in *nervous exhaustion* and in the unrest of nervous females. It is officinal in the tincture (*Tinctura Sumbul, U. S.* and *B. P.*), dose 1 to 4 drachms. Goodell uses the following formula:

℞.—Ext. sumbul.	gr. xx.
Ferri sulph. exsiccat.	gr. xx.
Asafœtidæ	gr. x.
Acid. arsenios.	gr. ½.

M.—Ft. in pil. No. xx. S. One t. d. after meals.

To be of any value the preparation must be fresh and the crude drug from which it is made must be good.

SWEET SPIRIT OF NITRE.

Sweet Spirit of Nitre (*Spiritus Ætheris Nitrosi, U. S.* and *B. P.*) or Spirit of Nitrous Ether is a mixture of alcohol, water, and ethyl nitrite. It is upon this last constituent that most of its value as a remedial agent depends. The drug as generally sold by pharmacists or others, who are not very careful to keep fresh preparations, is no better than alcohol and water alone, since the ethyl nitrite readily escapes, and deterioration at once asserts itself. Until recently the profession have had no ready means of protecting themselves from such poor preparations, but at present we know that all that is necessary is to add a grain or two of antipyrine to a half ounce or less of the spirit. If the ethyl nitrite be present a purple color followed made by adding 2 troy ounces of tannic acid to a ½ pint of glycerin and mixing at a gentle heat until solution occurs. It is useful as an application to slow ulcers and depressed mucous membranes, as in the mouth. In hæmorrhoids of the bleeding type tannic acid suppositories are often very useful, and cotton saturated with tannic acid solution is often used as a packing in vaginal leucorrhœa.

Administration.—The dose of tannic acid is 2 to 10 grains, best given in pill. The officinal preparations are: the troches (*Trochisci Acidi Tannici, U. S.*) each containing 1 grain of tannin, and an ointment (*Unguentum Acidi Tannici*). The *B. P.* preparations are *Glycerinum Acidi Tannici; Suppositoria Acidi Tannici*, each containing 3 grains, and *Trochisci Acidi Tannici*, containing ½ grain of the acid.

TANSY.

Tansy (*Tanacetum, U. S.*). The leaves and tops of *Tanacetum Vulgare* yield a volatile oil (*Oleum Tanacetum*) which possesses emmenagogue powers and has been largely used as a uterine stimulant. It is also used as an anthelmintic.

In poisonous dose it causes epileptiform convulsions in some cases and deep coma, with death from respiratory failure.

The dose of the oil as an emmenagogue is 1 to 3 drops.

In domestic medicine tansy tea, made by adding 1 ounce of the leaves or tops to 1 pint of water, and given in the dose of 1 to 2 ounces is largely employed as a remedy for *amenorrhœa.*

TARAXACUM.

Taraxacum, U. S., Dandelion, is a very old remedy for hepatic torpor and the dyspepsia resulting therefrom. It should be prepared from the fresh leaves or roots, as the dried stale plant is inert. From disregard of this fact much disappointment has arisen. Owing to its bitter taste it acts as a tonic. The extract (*Extractum Taraxici, U. S.* and *B. P.*), dose 5 to 30 grains, and the fluid extract (*Extractum Taraxici Fluidum, U. S.*), dose 1 to 3 drachms, are the only officinal preparations. *Succus Taraxici, B. P.*, is given in the dose of 1 to 2 drachms, *Decoctum Taraxici, B. P.*, is administered in the dose of 2 to 4 ounces.

TARTARIC ACID.

Acidum Tartaricum, U. S. and *B. P.*, is a vegetable acid much less powerful than acetic acid, but capable of producing very severe gastro-enteritis if taken in overdose and in concentrated form. It is rarely used alone and is most commonly employed to act upon sodium or potassium bicarbonate to form effervescent drinks. (See Seidlitz Powder and Effervescing Draught.)

When taken in poisonous dose, lime-water, alkalies, and magnesium are the antidotes, and opium is to be given to allay irritation. If necessary, emetics are to be used.

TEREBENE.

Terebene is a liquid substance, clear and colorless, and insoluble in water, having a peculiar odor like that of new pine sawdust, and is made by the action of sulphuric acid upon oil of turpentine, which is then distilled at about 160° F.

Therapeutics.—Terebene is a very useful stimulating expectorant, to be used in the late stages of *acute* or *chronic bronchitis* to liquefy and get rid of the mucus which is clogging the bronchial tubes. It has also been employed in *genito-urinary inflammations* of a subacute or chronic form in place of oil of sandalwood or copaiba as a stimulant. In *fermentative dyspepsia* it is of service as an antiseptic. The drug should always be given in capsules in the dose of 5 to 10 minims, or by dropping it on sugar. This dose may be repeated every three hours. Unfortunately it is very apt to irritate the stomach.

THALLIN.

Thallin is a synthetically prepared chemical compound otherwise known as parachinanisol. There are three salts of thallin, the sulphate, the tartrate, and the hydrochlorate. All of them are alike in appearance and taste, but the sulphate is generally employed. Given to man in a healthy state they produce an unpleasant taste in the mouth, but no other symptoms unless the dose be quite large. Buzzing in the ears, labored respiration, deep cyanosis and coma come on after excessive amounts are taken.

Physiological Action. NERVOUS SYSTEM.—So far as is known, its influence over the nerves amounts to almost nothing. No studies are on record of any such direct influence.

CIRCULATION.—Upon the circulation thallin has little influence in moderate dose, although its tendency is toward depression rather than stimulation. In very large doses it lowers blood-pressure by depressing the heart and peripheral vaso-motor system.

TEMPERATURE.—Thallin reduces normal bodily temperature very slightly and lowers febrile temperature by increasing the dissipation of heat.

TISSUE-WASTE AND URINE.—It increases the urinary flow, but its action on tissue-waste is uncertain.

ANTISEPTIC ACTION.—It posseses more antiseptic powers than other antipyretics, and one per cent. solutions prevent fermentation for some time.

Prolonged Poisoning.—In prolonged poisoning the drug causes degenerative changes in the kidneys and decrease in the number of the red blood-corpuscles.

Therapeutics.—Thallin has never obtained much hold upon professional favor for reasons not very easy to perceive. The studies of Minot seem, because of their American origin and care, worthy of special mention as in reality outlining the general opinion and thought of the practitioners on this side of the Atlantic in regard to this drug. Minot found that thallin acted more satisfactorily and with the most lasting effect when it was given at or just before the end of the fastigium. The effects of the drug were always most favorable, sweating and vomiting occurring but a few times, while in many instances the patient, previously restless and delirious, became tranquil and quiet. It was also found by Minot that the drug exercises no appreciable influence upon the duration of the disease in typhoid fever, and he concludes that it is sufficiently harmless to be given to very young children.

The writer's experience with thallin is too limited to permit of his speaking authoritatively concerning it, and he can therefore merely state that it has always seemed to him far less useful in fevers than many of the other drugs of its class. The fact that its influence is so transient, only from two to three hours as a rule, the necessity of its frequent dosage in consequence, and its liability to nauseate the patient by reason of its taste and action on the stomach, are all against its use. That it acts quite as rapidly, if not more so than antipyrine and acetanilide, there can be no doubt. It has been found, too, that the sweat is often very excessive, although there are some observers who assert that, in children particularly, this symptom is often absent. Jaccoud thinks that so many people have an idiosyncrasy to its use that small doses should always be used at first.

Owing to the transitory effects of the drug frequent administration of the remedy is necessary, and as this was first pointed out by Ehrlich, the term "thallinization of Ehrlich" is frequently heard of at the present time when the drug is spoken of. The doses under these circumstances should be given hourly in the amount of ½ to 1 grain, or even 2 grains in adults.

THYMOL.

Thymol, U. S. and *B. P.*, is derived from the oil of thyme and other volatile oils, and occurs in large crystals. Thymol is almost insoluble in water, but freely so in fats and oils. It is irritant, but antiseptic and disinfectant, and has been employed in typhoid fever as an *intestinal antiseptic* by Henry and others. Thymol has been used for dressing wounds, but is too costly. In summer weather it cannot be used, because of its attraction to flies, which makes the patient's life miserable. The dose is ½ to 2 grains, in capsule or in wafer, followed by a glass of milk. In *typhoid fever* as much as 30 grains in twenty-four hours may be given

If very large amounts (100 grains) are taken in a day, poisoning may result, but as much as this must be used before danger is present.

TOBACCO.

Tabacum, U. S. (*Tabacum Folia, B. P.*), is the dried leaves of *Nicotiana Tabacum,* a native of tropical America, but cultivated all over the temperate zone. It contains a liquid alkaloid, nicotine, but does not contain nicotianin, as no such principle exists.[1] When smoked it yields pyridine, which is sometimes used in medicine by itself.

Physiological Action.—Tobacco, in overdose, is a nauseating emetic, very depressant in its influence on respiration and the circulation. The pupils are contracted by its influence, the bodily temperature is lowered, and the skin becomes cold and clammy.

Upon the motor nerves it acts as a depressant poison.

Nicotine is one of the most violent poisons known, and is almost as fatal as hydrocyanic acid, death having taken place in three minutes after the ingestion of a poisonous amount.

The drug, when smoked or chewed to any extent by young persons, stunts the growth of all the parts, and is very apt to cause, in all persons, granular sore-throat, pharyngitis, laryngitis, and faucitis. Sometimes angina pectoris is developed. "Tobacco heart" is a term applied to a condition of this viscus, characterized by disorders in its rhythm or power; palpitation, arhythmia, and dyspnœa being often present.

The treatment of poisoning consists in the use of strychnine to stimulate the nervous system and the respiratory centre, cardiac stimulants, external heat, and atropine.

In the mild form of poisoning, following excessive smoking, in which slight nausea is felt, the author has found 1 to 2 drachms of Hoffmann's Anodyne taken in ice-water most effective.

Therapeutics.—Tobacco is used to relieve *constipation* by some practitioners, and for this purpose the wine (*Vinum Tabaci*) is usually employed in the dose of 10 minims every night on retiring to bed. The drug has been employed in many affections, such as *asthma*, *intestinal obstruction*, and *dropsy*, but has passed into disuse because the symptoms often produced were excessively severe and very serious to the patient. Applied in solution to *pruritus ani* and *vulvæ* it is often of service, but absorption may occur and produce untoward effects. It ought not to be used on piles for this reason.

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[1] See author's Prize Essay on Tobacco. Philadelphia, 1885.

TURPENTINE.

Terebinthina, U. S., occurs in two forms, namely, as turpentine derived from the ordinary yellow pine (*Pinus Australis*) and other varieties of pine, and as turpentine derived from *Abies Balsamea*, or Silver Fir, or other species of cone-bearing trees than *Pinus Australis*. The latter is sometimes called "Balm of Gilead."

Much confusion often exists in students' minds as to the difference between oil of turpentine (*Oleum Terebinthinæ, U. S.* and *B. P.*) and spirit of turpentine, both of which are identically the same substance under a varying name. This oil is not, however, the same thing as "turpentine," for the oil is distilled from turpentine. The distilled oil is a thin, clear fluid, having a peculiar odor and taste, and is irritant to the skin and mucous membranes. It is exceedingly inflammable, should never be placed near a light, and if added to any strong mineral acid takes fire.

Physiological Action.—Turpentine, when taken internally, produces a sense of warmth in the stomach, a quickened pulse, a warm skin, and slightly accelerated breathing. In overdose it may cause intoxication. Upon the circulation it produces a very slight rise of arterial pressure, increased pulse-rate, and increased heart-force. On the nervous system the drug causes, in large amounts, loss of sensation before voluntary motion.

The drug is eliminated by the kidneys and lungs, and gives the odor of violets to the urine.

Poisonous doses cause strangury, bloody urine, renal inflammation, and cyanosis, with dilated pupils and gastro-enteritis.

Therapeutics.—*External use.* Turpentine is used as a local application for the purpose of producing counter-irritation over any area where deep-seated *inflammation* exists. Under these circumstances it is almost always used in the form of a stupe, made as follows: Place a tin cup containing the turpentine in a vessel containing hot water so that the turpentine may be warmed without coming near a flame. Dip a piece of flannel into very hot water and wring it out in a twisted towel, and, when it is so dry that no water drips from it, dip it into the hot turpentine and wring it out again to free it from any excess of the drug. The cloth, while hot, should be locally applied, and allowed to remain until discomfort ensues, when it should be withdrawn, as it will blister if left on too long. In children and adults turpentine may be rubbed on the chest in *bronchitis* with much relief, but in the former class it should be diluted with sweet oil, half and half or even two-thirds.

Internal Use.—Turpentine is used internally as a stimulant of a diffusible type in the course of the *exhausting fevers*, particularly if any *flatulence* exists or if any ulceration of the bowels is present. In *typhoid fever* turpentine stupes, turpentine enemata, and the administration of the drug by the mouth, are the best ways to overcome tympanites. At the end of the second week, when the tongue is red, dry, cracked and brown, the teeth covered with sordes, and tympany is well marked, turpentine should be used in emulsion in the dose of 5 to 10 drops three times a day. Again, in convalescence from typhoid fever, when diarrhœa is persistent and relapses are constant and due to the unhealed state of Peyer's patches, turpentine is the remedy *par excellence*.

In *intestinal* and other *passive hæmorrhages*, such as *menorrhagia*, the drug is often of service.

Used against the *tapeworm* turpentine is given in the dose of half an ounce to an ounce mixed with an equal amount of castor oil. This is a somewhat dangerous practice, but is efficient. In chronic and well-advanced kidney disease it often requires very large doses of diuretics to stimulate the kidneys sufficiently to cause urinary flow, and turpentine may then be employed.

Turpentine is contra-indicated in any *acute inflammation of the gastro-intestinal tract* and in *nephritis*.

In lumbago 20 drops are said to be very useful and many have found it of value when inhaled from boiling water in *bronchitis* of a subacute or chronic form. In *gleet* it is given by the mouth to stimulate the genito-urinary tract. Turpentine should be tried in *purpura hæmorrhagica* as it has been found of value.

Administration.—Turpentine may be given in flatulence by placing 5 drops on a piece of sugar or in emulsion made by using acacia and a flavoring substance as follows:

℞.—Ol. cinnamomi	gtt. xx.
Ol. terebinthinæ	fʒiv.
Mucilag. acaciæ q. s.	f℥iv.

M.—S. A teaspoonful every four hours in typhoid fever.

A more agreeable preparation, not to be used in typhoid fever, is that recommended by Bartholow as follows:

℞.—Olei terebinthinæ	fʒj.
Olei amygdal. expres.	f℥ss.
Tinc. opii	fʒij.
Mucil. acaciæ	fʒv.
Aq. lauro-cerasi	f℥ss.

M.—S. A teaspoonful every four hours for tympanites.

When used as an enema the following is useful:

℞.—Olei terebinthinæ	f℥j.
Olei olivæ	f℥jss.
Camphoræ	gr. xx.
Mucil. acaciæ	f℥ss.
Aq.	f℥x.

M.—S. To be injected as an enema for *tympanites* and to aid in the removal of *hardened fæces.*

The liniment (*Linimentum Terebinthinæ, U. S.* and *B. P.*) is largely used as a stimulating application to *sprains* and *enlarged joints.*

Turpentine is of service in *ring-worm,* applied with a brush to the part affected. The following preparations are officinal in the *B. P.*: *Confectio Terebinthinæ,* dose 1 to 2 drachms, *Enema Terebinthinæ, Unguentum Terebinthinæ,* and *Linimentum Terebinthinæ Aceticum.*

The ointment is used as a counter-irritant and stimulant to the part to which it is applied. The liniment acts in the same way when applied to sprains and bruises.

UVA URSI.

Uva Ursi, U. S., Bearberry, is the leaves of *Arctostaphylos Uva Ursi,* a widely distributed evergreen shrub. This drug is known in the *B. P.* as *Uvæ Ursi Folia.* Its active principle is arbutin, sometimes called ursin.

Therapeutics.—Uva ursi is employed in medicine as a weak, astringent diuretic possessing alterative power over the genito-urinary apparatus. It is used in *pyelitis, cystitis,* and in *chronic gonorrhœa* or *gleet.* When taken in overdose it escapes from the body as hydrochinone, making the urine dark colored or black.

Administration.—Arbutin itself is often used in the dose of 3 to 5 grains. The dose of the fluid extract (*Extractum Uvæ Ursi Fluidum, U. S.*) is 2 to 4 drachms three times a day. An infusion (*Infusum Uvæ Ursi*) is officinal in the *B. P.,* dose 1 to 2 ounces.

VALERIAN.

Valerian (*Valeriana, U. S.*) is the rhizome and rootlet of *Valeriana officinalis,* a plant of Europe but cultivated in America. It is officinal in the *B. P.* as *Valeriana Rhizoma.* Its active principle is apparently a volatile oil (*Oleum Valerianæ*). It also contains valerianic acid.

Physiological Action.—Valerian is a very feeble depressant to the nervous system, tending to produce nervous rest, but in cats it excites to a great degree sexual activity, probably from its odor. When very large doses are given to man it causes a sense of warmth in the stomach, a slightly quickened pulse, and perhaps nausea and vomiting. Still larger amounts produce purging and mental hebetude.

Therapeutics.—Valerian is used alone or in combination with other drugs to quiet *nervous females* and relieves *nervousness* and *insomnia.* In *hysteria* it is often very serviceable, and combined with morphine is much used in the treatment of *delirium tremens.*

Administration.—The fluid extract (*Extractum Valerianæ Fluidum, U. S.*), dose 1 fluidrachm, and the ammoniated tincture (*Tinctura Valerianæ Ammoniatæ, U. S.* and *B. P.*), dose 1 to 3 drachms, are the best preparations for ordinary use. The infusion, which is not officinal, is given in the dose of a wineglassful, while that of the simple tincture (*Tinctura Valerianæ, U. S.* and *B. P.*) is 1 to 3 drachms. The dose of the oil (*Oleum Valerianæ, U. S.*) is 2 to 4 drops. An infusion (*Infusum Valerianæ*) is officinal in the *B. P.*, in the dose of 1 to 2 ounces.

VALERIANIC ACID.

Acidum Valerianicum is an oily, colorless liquid of a strong odor and burning taste, but is not employed in medicine except in the form of its salts, such as the valerianate of zinc, iron, quinine, or ammonium, all of which are employed partly for their sedative effects and partly for their influence as tonics.

The dose of *Zinci Valerianas* is ½ to 3 grains, that of *Quininæ Valerianas, U. S.*, 1 to 3 grains, of *Ferri Valerianas* 2 to 10 grains, and of *Ammonii Valerianas* 2 to 10 grains. Under the name of "the pill of the three valerianates" Goodell recommends the following in *nervousness* and *hysteria :*

℞.—Quininæ valerianat.
Ferri valerianat.
Ammon. valerianat } . . . . . āā gr. xx.
M.—Ft. in pil. No. xx. S. One or two three times a day.

VERATRINA.

Veratrina, U. S. and *B. P.*, is an alkaloid derived from *Veratrum Sabadilla*, and occurs in a grayish powder, which if it enters the nose produces violent sneezing which lasts for hours.

Physiological Action. NERVOUS SYSTEM.—Veratrine has little effect on the cerebrum, but it does excite the spinal cord and the voluntary muscles, thereby giving rise to tetanic or tonic convulsions, which are never clonic or epileptoid. The dominant action of the drug is paralytic and these nervous symptoms soon give place to paralysis. The muscles lose their contractile power and the nervous centres are depressed.

Circulation.—In poisonous dose the heart is slowed by the drug, greatly weakened, and finally stopped in diastole, and is found after death to be soft and flabby. In smaller doses it at first slows the pulse by stimulating the peripheral inhibitory nerves and the centres in the medulla, but later these parts are paralyzed. It first stimulates the vaso-motor centre, then paralyzes it.

Respiration.—The drug kills by failure of respiration due to paralysis of the respiratory centres.

Temperature.—Veratrine always causes a fall of bodily heat.

Poisoning.—The symptoms of poisoning in man are collapse, a pale, cold, wet skin, pinched features, and a rapid, thready pulse, accompanied by violent vomiting and muscular tremors. Tetanic convulsions may come on and resemble those of strychnine in that they arise from the slightest touch or draught of air; after death the muscles will be found to have lost their irritability.

Therapeutics.—Veratrine is never used internally. It is employed chiefly in the form of an ointment rubbed into the skin over *muscular rheumatism* and *rheumatic joints*, and over *neuralgic nerves.* The officinal ointment (*Unguentum Veratrinæ, U. S.* and *B. P.*), or the oleate (*Oleatum Veratrinæ, U. S.*), should be used, the latter most carefully, as absorbtion of the drug may take place in sufficient quantity to poison the patient.

VERATRUM VIRIDE.

Veratrum Viride, U. S., Indian Poke, Poke Root, or Swamp Hellebore, is an American plant largely used for the purpose of allaying inflammation; it is officinal in the *B. P.* under the name of *Veratri Viridis Rhizoma.*

It probably contains a number of principles, the chief of which are, however, jervine and veratroidine.

Veratrum viride is the safest and best circulatory depressant that we have for use in adults.

Physiological Action.—The physiological action of this drug is to be considered under the effects of its two alkaloids before the complete effect is studied.

Jervine.

When Jervine is given in full toxic dose it causes great slowness of movement, relaxation of the muscles, through which thrills continually run, and finally the animal falls to the ground. Violent epileptiform convulsions may now ensue, but no tetanus is present. The convulsions soon give place to paralysis and are characterized by their lack of force. Sensation is not affected until the near approach of death brings on anæsthesia. There is no evidence of gastro-enteritis and no vomiting or purging. The saliva is always increased and pours from the mouth. Death results by failure of the respiratory centres and an almost simultaneous failure of the heart. The circulation is greatly depressed and the pulse-rate and force are far below their normal rate and strength.

The blood pressure is very low except when the convulsion produces a temporary rise, but the condition of the vaso-motor centre and vagi is apparently normal. Jervine acts as a direct depressant to the vaso-motor centres. The convulsions are due to the disturbance of the circulation at the base of the brain (Wood), and the spinal cord is directly depressed by the effect of the jervine on its motor tracts.

Veratroidine.

This alkaloid is much more irritating than jervine, and in overdose causes vomiting and purging. The muscular twitchings and convulsions caused by jervine are also produced by it, but are generally not so severe. It also depresses the spinal cord in its motor tracts.

On the circulation veratroidine slows the pulse by stimulating the pneumogastric centres, and finally quickens it if given in very large doses, by paralyzing the peripheral vagi.

The following summary given by Wood of the circulatory effect of veratrum viride, from a study of its alkaloids, is so brief and terse as to be worth insertion here: "Veratrum viride slows the pulse by a direct depressant action on the heart muscle (jervine), and by stimulating the pneumogastric nerves (veratroidine); it lowers blood pressure by action on the heart muscle (jervine) and by depression of the vaso-motor centre (jervine)."

Poisoning.—Veratrum Viride, while one of the most powerful drugs we have, is one of the least dangerous, since it almost invariably causes vomiting before enough of the drug is absorbed to produce serious consequences. The vomiting is partly due to the veratroidine and partly to an irritant resin. In poisoning cardiac stimulants, atropine, external heat, the placing of the head below the feet on an inclined plane, and the use of strychnine as a respiratory and nervous stimulant are to be resorted to.

Therapeutics.—The chief use of veratrum viride is as a circulatory sedative in *acute, sthenic,* or *dynamic inflammations.*

In *pneumonia*, *pleurisy*, *acute hepatitis*, *peritonitis*, and *cerebritis* it is of the greatest value if given at the proper stage when only congestion or hyperæmia is present. After the onset of the lesions following this period, its use is not only valueless but malpractice. Owing to its physiological influence it bleeds a man into his own blood-vessels, and the indications for its use are the same in inflammation as they would be for bleeding. In *puerperal fever* it has been highly recommended but must be most carefully employed. It is also of value in excessive *cardiac hypertrophy* and in the *irritable heart* of strong healthy men. In *aneurism* where the circulatory disturbance is great and the arterial pressure high, the drug may be used, with great care, to decrease the pressure and prevent rupture of the diseased vessel.

CONTRA-INDICATIONS.—Veratrum viride is contra-indicated in all conditions of depression or exhaustion, and if vomiting is feared, must not be given in peritonitis or gastritis as it may cause emesis, and in this way disturb and irritate the abdominal contents.

Administration.—The doses in inflammation should be given every half hour or hour and at least 1 drop of the tincture should be used each time in a healthy adult. In the course of two or three hours, or less, the skin becomes moist and relaxed, the pulse slower and less angry, and slight nausea may be present. These symptoms show that the drug is exerting its influence and it should now be withdrawn, or in very sthenic cases pushed a little farther. If vomiting comes on before the drug has acted on the circulation, 5 to 10 drops of laudanum should be given 15 minutes before each dose of veratrum viride. The best preparation to employ is the tincture (*Tinctura Veratri Viridis*, *U. S.* and *B. P.*), dose 1 to 3 drops, and the fluid extract (*Extractum Veratri Viridis*, *U. S.*) 3 to 6 drops. Under the name of Norwood's tincture, a saturated tincture has been sold. It is not officinal and ought never to be used.

VIENNA PASTE.

Potassa cum Calce, *U. S.*, is a milder and more manageable escharotic than is caustic potash, and is used for the same purposes. (See Caustic Potash.)

WARBURG'S TINCTURE.

Warburg's Tincture is a complex liquid formed by the mixing together of no less than thirteen ingredients. Its inventor, Dr. Warburg, held its composition as a secret for a time, but finally made it public. Since he published the original formula it has been considerably altered, and some of the preparations now sold as Warburg's tincture contain none of the original ingredients. Further than this some of these ingredients are now not obtainable. It ought to be made as follows, if possible:

℞.—Aqueous extract of aloes	28 grains.
Rhubarb	448 "
Angelica seed	448 "
Elecampane	224 "
Saffron	224 "
Fennel	224 "
Gentian	112 "
Zedoary root	112 "
Cubeb	112 "
Myrrh	112 "
White agaric	112 "
Camphor	112 "
Sulphate of Quinine	1280 "
Dilute alcohol enough to make 8 pints.	

The coarse vegetable portions of this list are to be ground into a coarse powder, and the myrrh and camphor, which have been previously pulverized, added to them. The entire mass, less the quinine, is then digested for 12 hours in a well covered vessel, on a water bath, the alcohol being prevented from evaporating as much as possible. The liquid is now to be strained under pressure and the sulphate of quinine added and dissolved.

Therapeutics.—Warburg's tincture, next to pilocarpine, is the most powerful sweat producer that we have, and possesses in addition very remarkable anti-malarial power. In this last respect, it far exceeds quinine as a remedy in pernicious malarial regions for acute attacks and as a prophylactic. Its advantages over quinine rest in its favorable action where congestions accompany the paroxysm.

Administration.—To be of any value, Warburg's tincture should be given according to the following rules: The bowels of the patient should be first opened thoroughly by a saline purge, ½ an ounce of the tincture being given in one dose undiluted and no drink being taken. After the lapse of two or three hours a second ½ ounce is given in the same way, and very shortly a profuse sweat appears, which generally marks the crisis of the disease, and recovery soon takes place.

ZINC.

Zincum is not employed in medicine in its metallic form but as several of its salts, of which there are a large number, each of which will be found under the names of the acids forming them.

Physiological Action.—Nearly all the salts of zinc are somewhat astringent, and when taken internally act as depressants to the nervous system. Some of them are more irritating than others, such as the chloride and sulphate, whereas the valerianate has almost n power except so far as the valerian is concerned.

All of the salts in excess produce organic changes in the nervo system, generally represented by a myelitis, which, in the case of lea is ascending, but in that of zinc transverse.

The drug is eliminated by the liver and kidneys. Chronic poiso ing among workers in zinc is rare but has occurred. The sympto closely resemble those of chronic lead-poisoning.

PART III.

REMEDIAL MEASURES OTHER THAN DRUGS, AND FOODS FOR THE SICK.

ACUPUNCTURE.

THIS is a term applied to the insertion of a small pointed instrument into the tissues in any part of the body for the purpose of relieving pain, swelling, or dropsies. When used in painful affections it accomplishes its best results in lumbago and sciatica, particularly in the former. In lumbago the writer takes two darning needles, places them in boiling water to render them aseptic, and inserts them into the affected muscles upon both sides, one to one and a half inches and allows them to remain in place for several minutes. They are then slowly withdrawn, care being taken to prevent them from breaking off. Often the patient can at once move more freely to his great delight. Ringer has, with his usual clear clinical sight, noted that this treatment is more successful in those who have bilateral pain than in those cases who have one side affected, and the writer has found this statement invariably true.

In sciatica acupuncture is less successful than in lumbago, but is always to be tried. The needle should be carried down until it reaches the nerve, and, perhaps, pierces its sheath, and it must be absolutely aseptic. Bartholow has recommended the use of a hypodermic needle and the simultaneous injection of a few minims of chloroform or morphine. Sometimes the best results are reached from inserting the needle immediately below where the nerve finds exit from the pelvis. In other cases it is asserted that the insertion of a needle, over a corresponding spot to that which is sore, on the sound side may do good. Acupuncture is useless in acute rheumatism and lumbar pain produced by fevers.

Sometimes a rhigolene spray may be used to freeze the skin over the parts with advantage in lumbago or sciatica.

Acupuncture is occasionally resorted to for the relief of dropsy, but it is not commonly so employed, although it is often a useful measure. When the limbs become so tense with the effusion as to endanger the life of the skin the tension should be removed by incisions, not punctures, if saline purges fail or cannot be used. Punctures rapidly close and make hard spots, while incisions remain open and permit free drainage. Immediately after the incisions are made the parts are to be dressed with cotton previously saturated with boracic acid solution and dried, or by absorbent cotton sterilized by baking it in an oven. It is hardly necessary to point out that the incision must be made under antiseptic precautions. (See Antiseptics.)

ANTISEPTICS.

The term "Antiseptic," as generally used, does not necessarily imply the power to destroy pathogenic germs. Any substance which inhibits the growth of microörganisms, which destroys or render innocuous the poisonous products of their action upon the tissues of the body, or which retards or prevents the absorption of such products, is properly termed antiseptic. Since germicides necessarily possess antiseptic attributes they should, strictly speaking, be classed with antiseptics; in this portion of the work, however, only such drugs as are sufficiently innocuous to allow of their use in the human body or upon its surface will be considered. Some of these, as, for instance, carbolic acid and bichloride of mercury, are efficacious, solely from their germicidal properties. Others, and of this class iodoform is the most important and typical example, exert their influence not upon the microörganisms but upon the toxic substances formed by these organisms.

Of the long list of antiseptics which have within recent years received warm commendation at the hands of individual writers there are comparatively few which have retained the confidence of the profession after prolonged trial. Only these few well-proven drugs will be discussed in this article.

Heading the list, and in its germicidal power far surpassing all others, is *bichloride of mercury*. Long since the researches of Koch have shown that this salt is efficacious as a germicide in dilution of 1 to 50,000. He stated, however, that where albumin was present the bichloride was decomposed and rendered inert. The same change was observed when solutions were allowed to stand for some length of time, even when distilled water was used as a solvent. By the addition of either sodium chloride or a weak acid such decomposition was prevented.

From this it follows that under ordinary circumstances the solutions of bichloride should be freshly prepared, or, if it is desirable to keep them for a long time, a sufficient amount of sodium chloride should be added to prevent precipitation of the mercury salt. Koch advised that as much salt should be added as would equal the weight of the sublimate. Other observers, however, have advised ten times this weight of sodium chloride.

Since whenever bichloride solutions are used in wounds or in cavities of the body they are brought in contact with blood serum or other albumin-bearing substances, care must be taken that the antiseptic powers of the mercury lotion are not destroyed by the decomposition of its active principle. The power of the solution may be preserved by using it in such large excess that the small amount of chemical change has practically no effect, or by combining with it, as stated above, an acid which will not in itself be unduly irritating to raw surfaces. This end is accomplished by tartaric acid. In making up a solution one part of bichloride and five parts of tartaric acid are added to as much water as is needed. Thus in making up a solution of 1 to a 1000, for surgical purposes, the following prescription may be employed:

℞.—Hydrarg. chlorid. corros.	gr. xv.
Acid. tartaric.	ʒj–gr. xv.
Aq. dest.	Oij.

Bichloride solutions are used in the strengths of 1 to 500, 1 to 1000, and 1 to 2000, in the treatment of ordinary wounds. For the irrigation of large cavities solutions of a strength greater than 1 to 10,000 should rarely be employed, and even these dilute lotions have, when used in the peritoneal cavity, given rise to toxic symptoms. The 1 to 2000 solution is the one generally employed for sterilizing wounds and irrigating during operations. The stronger solutions of 1 to 500 or 1 to 1000 are used in cleaning the surface of the body.

The ordinary method of preparing a surface of the body for operation is as follows: The part is first thoroughly scrubbed with soap and warm water, is shaved, and is washed again as before. It is then cleansed with alcohol or ether, after which a scrubbing with bichloride solution of 1 to 500 should follow, and be continued for at least two minutes. If no surgical interference is indicated immediately, the whole operative region should be enveloped in towels wrung out in a solution of 1 to 500, or 1 to 1000, and kept thus protected until the surgeon is prepared to operate. The moment the skin is incised no lotion stronger than 1 to 2000 should be employed, or if the more powerful solutions are used they should immediately be flushed out with one of less strength. The dressings, unless some particular form is used, may consist of boiled, bleached, and sun-dried gauze soaked in a 1 to 500 bichloride solution, and subsequently washed and wrung out in a 1 to 3000 dilution of the same antiseptic.

Next in order of importance and in efficacy, among the antiseptic preparations, are *carbolic acid* and its solutions. The particular value of this drug lies in the fact that its potency is equally developed in both albuminous and non-albuminous solutions. Like the mercury salts its great disadvantage lies in its toxic properties. It is usually used in solutions of 1 to 20 and 1 to 40. The carbolic acid of commerce is found in a liquid form, dissolved in alcohol, and represents a strength of about 95 per cent. In making the solution for surgical purposes an ounce of this liquid is added to 20 or 40 ounces of water according to the strength of the solution desired. Although carbolic acid is soluble in fifteen parts of water, this solution does not take place immediately, and in making solutions of strength of 1 to 20, either the water must be hot, or a certain amount of time and considerable agitation of the mixture are required, otherwise globules of almost pure carbolic acid are deposited in the bottom of the tray or vessel into which the solution is poured, and these, by coming in contact with instruments or with the hands of the operator exert an undesirable cauterant effect.

The 1 to 20 solution is used for the disinfection of instruments and the cleansing of surfaces. For half an hour before an operation it is customary to submerge all instruments which will be required in a solution of this strength; when the surgeon is ready to use these instruments the solution is diluted to 1 to 40 by the addition of an equal volume of water which has been boiled. If a carbolic lotion is employed for irrigation, or for cleansing sponges during an operation, it should not be stronger than 1 to 40.

A property possessed by carbolic acid, which renders it an unsafe medium for the impregnation of gauze, is its volatility. After an exposure of a few hours to the atmosphere it entirely evaporates, leaving not an antiseptic but simply a sterile dressing. This fact is utilized by the surgeon in the preparation of the deeper layers of the dressing, which come in immediate contact with the lips of the wound. Since all antiseptics are more or less irritating to raw surfaces, healing will be promoted by a sterile rather than by an antiseptic application. By moistening a piece of boiled and sun-dried gauze sufficiently large to cover the wound edges in a carbolic solution 1 to 20, the asepticity of this dressing is assured; in a very few hours the heat of the body causes the entire evaporation of all the carbolic acid, leaving a sterile, non-irritating surface in contact with the wound. If protective is used or oiled silk is applied beneath the dressing, these materials should be treated with carbolic acid in the same way.

In addition to its toxic effect upon the patient, carbolic acid greatly irritates the hands of the surgeon, and if used in a strength of more than 1 to 40 causes so much benumbing of tactile sensibility that manipulative skill is seriously interferred with. The cracked and fissured fingers resulting from the use of carbolic lotions are familiar to all, and at times produce results of far more serious import than temporary pain and discomfort; many recesses are provided in the depths of which septic germs may successfully resist the action of antiseptic washes. There can be no question that septic poisoning has been frequently due to this fact.

Iodoform occupies a unique place among antiseptics in having been almost universally accepted and used by surgeons and clinicians in spite of the fact that its germicidal action was well proven by laboratory research to be practically *nil.* It was found that nearly all forms of pathogenic germs grew abundantly upon culture materials, the greater part of which was made up of iodoform, and that injections of such germs, mingled with large quantities of iodoform, produced the characteristic effect upon living tissues with almost as great certainty as though this drug had not been used; furthermore, it was shown that iodoform was not even sterile, and that as employed by surgeons it was frequently a cause of infecting previously aseptic wounds.

In spite of this overwhelming evidence against it the drug steadily grew in favor. Recent researches have explained, in part at least, the reason for this contradiction between experimental and practical results. It has been well said that the human body is not a test-tube, and that bacteriological research cannot supplant the evidence of clinical observation. Elaborate investigation showed that this drug acted as a powerful antiseptic, not by destroying the germs but by undergoing a decomposition in their presence, the products of which render the ptomaïnes, the result of germ growth, inert. In this way suppuration is, to a certain extent, inhibited, or, if present, its disastrous effects upon the system at large are prevented since these are due to ptomaïne absorption rather than to direct effect of the microörganisms themselves. It has been apparently well proven that ptomaïnes, in themselves and without the presence of microorganisms, can generate pus, but that where such ptomaïnes are mixed with iodoform before injection no pus is formed. If these septic chemical compounds are rendered inert a powerful adjuvant to the destructive action of the germ upon living cells is removed, and thus the system is often enabled to overcome one enemy where two would have prevailed. The fact that iodoform is in itself not sterile is, from a practical standpoint, most important. Fortunately, sterilization is readily accomplished. A thorough washing in a 1 to 1000 bichloride solution destroys all microörganisms, and the powder may then be used without fear of producing infection.

It will be readily understood from the foregoing that iodoform is of little service in aseptic wounds; that it becomes of utility in direct proportion to the foulness of discharge, and that to exert its influence it must be applied directly to the part. It is liable, in suppurating wounds, to form a hard crust with the discharges, thus frustrating one of the most important indications in antiseptic surgery, *i. e.*, drainage. Particular care should be exerted to see that the wound's secretion has a free exit.

As employed in surgery iodoform, after having been sterilized, is placed in small pill boxes or wide-mouthed jars, over the opening of which is tied a single layer of antiseptic gauze; through this the iodoform is sprinkled, as desired, over wound surfaces.

Kreolin, or *Creoline*, a preparation obtained from English coal by dry distillation, has been steadily and rapidly growing in popular favor, and bids fair to rival carbolic acid. In addition to its powerful germicidal effect it is non-irritant and practically non-toxic. The claim first advanced that this preparation was absolutely non-poisonous can no longer be supported, since cases have been reported where toxic symptoms have followed its use; these were probably due to individual idiosyncrasy, a factor which we can never hope to overcome entirely. It is certainly true that kreolin is the least poisonous of all the powerful antiseptics heretofore used. As an added advantage, in place of the harsh irritating effect produced upon surfaces by carbolic acid solutions kreolin exerts an influence very like that of an oily or mucilaginous preparation.

The extravagant claims advanced for kreolin in regard to its germicidal property have not been confirmed by bacteriological investigation. In solutions containing albumin it is not efficient as a germicide in strengths of less than 1 to 100, its power being somewhat below that of carbolic acid; since, however, its toxic properties are much less marked than in the case of the latter drug, it can be safely used in stronger mixtures and, therefore, for practical purposes, its strength is greater.

Kreolin, though insoluble in water, readily forms an emulsion quite as efficacious in its antiseptic properties as a true solution. Since this emulsion is opaque it is scarcely applicable for immersing and sterilizing instruments, the latter not being readily found. It is admirably suited, however, for cleansing the hands, a five per cent. solution neither cracking the skin nor benumbing the sensory nerves. In irrigating large wounds, cavities of the body, and particularly as a means of preventing sepsis or aborting it in gynæcological work, kreolin can be warmly commended. It may be employed in a strength of from 0.2 to 5 per cent.

Barring the opacity of its emulsion in water it would be the medium, *par excellence*, for rendering instruments sterile and maintaining them in this condition during an operation.

Among the many antiseptic agents of less importance may be mentioned *peroxide of hydrogen*. This drug comes in what is termed a fifteen volume solution. By this is meant that fifteen volumes of feebly combined oxygen are contained in each volume of the liquid. The few who have used it report remarkable results. It is applicable not to sterile surfaces, but to suppurating wounds and sinuses. It is alleged that peroxide of hydrogen immediately destroys the microörganisms of pus, converting, in one or two applications, a septic wound into one which is sterile and which will promptly heal. It is used in the strength of from 5 per cent. up to full concentration. Its disadvantages lie in the fact that it is expensive and that it readily undergoes decomposition. In this latter circumstance, possibly, lies the explanation of its want of popularity, since the preparations vary so greatly in strength that it is impossible to determine to what extent they should be diluted or what may be their potency when applied. (See Oxygen.) When this drug is poured into a suppurating sinus or cavity an ebullition takes place, which ceases only when the drug is exhausted or the infected surfaces are rendered sterile. With more extended trial the true value of this preparation will be determined.

Chloride of zinc has been extensively employed in some clinics as an antiseptic application. It is used in 10 per cent. solutions and is applied when the field of operation is probably infected by preexisting pus formation. Although bacteriological research has shown that this agent possesses feeble antiseptic power clinical experience demonstrates its great value as applied to infected surfaces. Lately the *sulpho-carbolate of zinc* has to a great extent replaced the chloride as being less toxic and irritating and far more potent.

For sterilization of mucous surfaces a saturated aqueous solution of *boric acid* is commonly employed.

The increasing popularity of the latest dressing prepared by Lister, and its possession of qualities apparently superior to those of any other dressing yet described, make it desirable to give a brief description of the method of preparation described in Lister's latest writing on this subject. "Cyanide of potassium, cyanide of mercury, and sulphate of zinc are mixed together in solution, in quantities proportioned to the atomic weights of $2KCy$, $HgCy_2$, and $ZnSo_4 + 7H_2O$; the cyanide of potassium and cyanide of mercury being dissolved together in 1½ ounces of water for every 100 grains of potassium cyanide, and added to the sulphate of zinc dissolved in three times that amount of water. The precipitate is collected in a strainer, and, when well drained is washed with two successive portions of water equal in quantity to that used for the solutions, namely, 6 ounces for every 100 grains of potassium cyanide, at least this amount of washing being essential in order to free the precipitate sufficiently from the highly irritating soluble salts which are associated with it in its formation. The precipitate having thus been washed and drained, but not dried, it is thoroughly diffused with pestle and mortar in distilled water (6 ounces for every 100 grains of potassium cyanide), containing in solution 1 part of hematoxylin for every 100 parts of the cyanide salt, the amount of which is known from the circumstances that the dry product of cyanide salt is almost exactly equal in weight to the potassium cyanide employed. Hematoxylin is readily soluble in a small quantity of hot water, and remains in solution when added to a large quantity of cold water. The cyanide salt while it precipitates the hematoxylin, changes its color to a pale bluish tint. This is advantageously enhanced by the addition of a little ammonia to the mixture, in the proportion of one atom of ammonia ($NH_3=17$) to each atom of hæmatoxylin ($C_{16}H_{14}O_6 3H_2O=356$). More than this amount proves prejudicial. The ammonia is added in a dilute form, and it is convenient to have the dilution such that 1 fluidrachm of the ammoniacal liquid shall correspond with 1 grain of hematoxylin. The dye is further economized by allowing the ammoniated mixture to stand for three or four hours, and stirring it occasionally, so that the ingredients may react thoroughly upon each other. If the mixture is filtered immediately, there is considerable loss of coloring matter. The dyed salt, having been drained and dried at a moderate heat, is levigated, and may then be kept for any length of time fit for use. When employed for charging a dressing it is diffused by means of pestle and mortar in solution of bichloride of mercury (1 to 4000) in sufficient abundance to drench the fabric thoroughly, for which 4 imperial pints to 100 grains of the salt will be found adequate. This will give a percentage of between 2 and 3 of the cyanide to the dry gauze. The gauze should always be used moist; and if it be prepared for immediate use, as by the dispenser of a hospital, the process of drying may be omitted; the gauze, after being hung up for a while to drain, being deprived further of superfluous moisture by placing it for a while in a folded sheet. It may afterward be conveniently kept moist by wrapping it in a piece of mackintosh cloth. When obtained dry from the manufacturer, it should be moistened again with the weak corrosive sublimate solution before it is used."

The advantages claimed for this dressing are that it is not irritating to the skin, and that the antiseptic substance is not soluble, hence is not washed out by discharges.

An omission of the details of cleansing the hands of the surgeon and assistants in preparing for an antiseptic operation is scarcely permissible in writing upon the subject of antisepsis. The most approved method is as follows:

The hands and forearms are thoroughly brushed in hot soap suds for several minutes, after which the nails are carefully cleaned by a knife and brush, and the washing again repeated; the hands are then washed in alcohol for one minute, special attention being paid to the nails; finally they are soaked for three minutes in a solution of bichloride (1 : 1000) and during the course of the operation are occasionally washed in a solution of the same strength. If it is necessary to lift a chair, to turn the patient, or to touch any object which has not been previously sterilized, the hands should be enveloped in towels wrung out in 1 to 1000 solution or immediately washed again.

COLD AS A REMEDY.

Cold, or the rapid abstraction of heat, is an appliance nearly always at hand and possessed of very great power for good in properly selected cases. At the very first we may divide its use into its local application for a limited, deep-seated, or distant influence, and its general application for the purpose of affecting the entire body.

When cold is applied for its limited and local action it is always used with two objects in view, namely, to cause localized contraction of bloodvessels, which, through inflammation, are engorged so that the parts are reddened and swollen, or temporarily to anæsthetize or benumb a nerve fibre for the immediate relief of pain and with the hope that the temporary paralysis may result ultimately in such nerve changes as to produce a cure.

For these reasons cold, in some form, is a popular remedy for a burn or sprain, or any injury likely to be followed by inflammatory processes. In some cases, it is true, hot water or dry heat is equally efficacious, and this fact will be referred to again when speaking of heat. (See Heat.) It may, however, be stated, as an almost invariable rule, that the choice of heat or cold is to be governed by the sensations of the patient, who will generally assert that one of the two is the more agreeable.

Cold or heat causes relief of pain in inflammation by producing contraction of the local bloodvessel walls. As a result inflammatory exudates do not occur, congestion is relieved, and as the pressure on the nerve filaments ceases the pulsating pain of inflammation passes away.

A very useful remedy for the sprain of an ankle, when it is a recent accident, is to let the patient sit with the foot elevated, with a cloth wrung out in ice-water, or an ice-bag applied over the part affected.

In the treatment of localized pain, cold is used in a number of ways, largely depending in their choice on the will of the physician and the wealth of the patient. The simplest, cheapest, and perhaps the most efficient method of using cold is to place cracked ice in a pig's or sheep's bladder, and after tying the opening to prevent leakage, to lay it directly on the skin, surrounding it with a towel so as to prevent the moisture, which comes on the surface from condensation, from wetting the clothing.

Where a very limited and comparatively transient effect is needed, it is customary in hospital and private practice to use a piece of ice sprinkled with a little fine salt, and held against the skin by means of a towel in the hand of the physician. Actual freezing can often be obtained in this manner very rapidly.

Where a more rapid and elegant method is desired, sprays of various very volatile liquids may be driven against the part by an atomizer. Probably the most readily employed of these liquids is ether, which is fairly effective if it is used in a fine spray and driven against the skin in such a way as to favor rapid evaporation. Another of these agents is rhigolene, which is the lightest and most volatile of the liquid products of coal-tar, and is used in a spray from an atomizer in the same manner as is ether. Chloride of methyl is a gas, which is very inflammable, of a sweetish smell and taste, and is used as a substitute for rhigolene as a local anæsthetic through the intense cold produced by its application. It is to be directed against the skin over the involved area by means of a tap attached to the cylinder containing the gas.

It is hardly necessary for the writer to repeat that as all these last three applications are very inflammable, they should not be used near a light or fire.

Aside from the local effects of cold on inflammatory processes it is largely resorted to for the relief of neuralgia of a superficial type and has often been used for rather deep-seated neuralgias, as over the course of the sciatic nerve in sciatica. Generally, however, it is employed in neuralgia of the supra-orbital nerve where, owing to the superficial position of these fibres, the cold can readily penetrate. The skin should be distinctly whitened and blanched and even hardened by the cold before its application ceases, and if one application does not cause a cure it may be repeated every day for several weeks in obstinate cases. Sometimes cold is used to benumb the skin or subcutaneous tissues in cases where a minor surgical operation is to be performed, and is undoubtedly superior to cocaine where one wishes to open boils or small abscesses. It is also valuable when one is using the actual cautery, and in all these cases may be employed as is indicated above.

The local employment of cold for the influencing of deeply-seated organs is not only a well-recognized therapeutic measure, but of great practical and physiological interest, and is so closely associated with the subject of counter-irritation as to be worthy of comparison with the article on that subject, before considering the subject as sufficiently studied to render its use clear. According to Winternitz, cold applied to the feet affects the cerebral circulation, cold to the thighs the circulation in the lungs, and cold to the back the circulation around about the pituitary region. Whether these assertions are true we do not positively know, but the fact that Winternitz has reached them by a series of experimental studies indicates their correctness to a great extent, and they also find additional support in the popular and medical confidence in the use of cold to the head and heat to the feet in cerebral diseases.

Practically cold has been employed with no small degree of success in the treatment of pneumonia and pleurisy in the form of the ice poultice or ice jacket. The only thing needful for such treatment is a condition of strength on the part of the patient, for it should not be used in adynamic cases. Where the ice poultice is used it is made by taking a mass of finely chopped ice, draining it of all water, and mixing it thoroughly with dry saw-dust, in sufficient quantity to absorb all the water derived from the ice as it melts. This is then basted into a quilt, so arranged that all of the contents will not sag to the lower border, and wrapped around the chest, being then well covered by a layer of oiled silk. Cold has also been highly recommended when used in pneumonia in another manner, and especially by no less prominent an authority than Niemeyer, who speaks of it as follows:

"I have made extensive employment of cold in the treatment of pneumonia, and, relying upon a large number of very favorable results, can recommend this procedure. In all cases I cover the chest of the patient, and the affected side in particular, with cloths which have been dipped in cold water and wrung out. The compresses must be repeated every five minutes. Unpleasant as this procedure is in almost all cases, yet even after a few hours the patients assure me that they feel a material relief. The pain, the dyspnœa, and often the frequency of the pulse are reduced. Sometimes the temperature goes down an entire degree. My patients often retain this surprising condition of improvement throughout the entire duration of the attack, so that their outward symptoms would hardly lead one to imagine the grave internal disorder. The relatives of the patient, too, who do not fail to perceive the improvement, now readily assist in the treatment to which at first they were opposed. In a few cases, and only in a few, the use of cold affords no relief, and the troublesome manipulation for its application increases the distress of the sufferers so much that they refuse to keep it up. In such cases I have not insisted upon the further application of cold.

"In the hospital at Prague every case of pneumonia is treated with cold compresses, and, according to the statements of Smöler, it is exceptional for a patient not to feel material relief from this treatment. I should only ascribe a palliative influence to their use, had not the duration of the disease in many instances been decidedly shortened and the convalescence hastened by means of their energetic and methodical employment. In fact, in but few cases have we seen the disease delay its departure until the seventh day. Many have improved on the fifth, and a very large number as early as the third day; nay, I have repeatedly found it impossible to keep patients with recent pneumonia in the hospital for a longer period than a week. Cold is rightly regarded as one of the most efficient antiphlogistics in inflammation of external organs. Its action is directly tonic upon the relaxed tissues and dilated capillaries."

The use of a cold bath, for the purpose of increasing the tone of the system, is as old a custom as any which we have, but like all other things in medicine cannot be used without distinct indications for its employment, or, to speak more correctly, the absence of certain contra-indications. The most universal exception to its use which we find is that class of persons with whom bathing of any kind, particularly when frequently repeated, does not agree. The writer is sure that a much larger number of persons belong to this class than is generally recognized, and he has seen cases of nervous exhaustion and general loss of vivacity and vitality occur as a result of too frequent bathing. This is the case more especially with daily bathers, who use cold or warm fresh water, particularly if the bath be taken in the morning. Before passing on to a consideration of the physiological action of a bath, and why and where we should use it, it is proper to call attention to the fact that a very large proportion of children who are bathed daily are also allowed to lie and soak in the tub, and as a result become debilitated and fretful, only to recover when the bath is used once or twice a week, and replaced on the other days by a nightly sponging off with salt and whiskey or salt and water.

Through practical experience and much experimental research of a more or less reliable character, we now know that the following phenomena accompany the use of a cold bath in a healthy person with whom such a bath agrees.

On entering the water he shivers, thinks it almost unbearably cold, his teeth chatter, and he gasps if the cold suddenly touches the belly wall, or any exposed surface. In a moment, however, reaction sets in, and the extremities heretofore blue, trembling, and covered with *cutis anserina*, become warmer and flushed. The pulse is increased in force and frequency, and the respirations are deeper and more thoroughly performed. As a result of this each portion of the body receives a more perfect supply of blood and feels rejuvenated. Following this stage of exhilaration a third comes on in which the blueness and depression of the first stage recur in an exaggerated degree, but this condition does not ensue unless the person remains too long in the water. If he leaves the bath while in the acme of his exhilaration, the stimulus may remain with him throughout the rest of the day.

The reason for the occurrence of this train of symptoms is not far to seek. The chilliness of the first stage shows that the great abstraction of heat is lowering the bodily temperature, the centres for calorification in the body not manufacturing all the heat that is needed for the preservation of the normal temperature. At first the cold drives the blood hurrying into the warm recesses of the body, leaving the surface of the body cold; but in a few moments the system is aroused to the recognition of the fact that it must increase its exertions in the propulsion of blood and manufacture of heat, and so with an effort it puts forth all its power, picks up each corpuscle that is hiding from the cold in the internal organs, and, after imbuing it with warmth obtained by increased heat-production in the sources of heat manufacture, forces it out to the surface of the body along with its fellows, which are driven to all parts of the system. This is not a mere figurative way of putting the matter, for cold always contracts bloodvessels and reflexly stimulates the vital centres to increased activity.

en the bath is too prolonged the result of over-stimulation en-
nd the depression of the nervous system and circulation is
ntly severe to interfere greatly with normal functional activity.
at this point it becomes clear why persons "catch cold" or,
echnically speaking, are attacked by local or general conges-
One person who is weak may never reach the stage of stimu-
because his system has not enough units of force in it to bring
ogether and expend them upon the functional activities named,
a consequence, the blood, which at the first shock has hurried
e internal viscera, is not driven back to its duty, but sulking
etreat like a deserting soldier allows disaster and disease to
because its superior officer, the central nervous system, cannot
together enough force or authority to make it do its duty.
cases present evidences therefore of circulatory and systemic
sion, or have congestion of the lungs, liver, or other parts. In
rong person exactly the same state of affairs obtains in the
tage of depression, but only after the strength of the system
en expended in the activity of the stage of exhilaration.

l salt baths, particularly if they are sea baths, are more stimu-
and not so relaxing as is fresh water bathing.

l effusions to the head, or, better still, the use of an ice-bag,
ong held a high position in the treatment of meningitis and
njuries, and a hot bottle to the feet, and cold to the head will
cause sleep in insomnia. This is particularly the case with
persons who have wakefulness from mental over-work. On
er hand, cases with insomnia from cerebral anæmia do well if
plunge bath is taken before going to bed, although in still other
hot bath is more efficacious. (See Heat.) The latter instances
t due to anæmia but to nervous irritability which the heat
whereas, the insomnia of cerebral anæmia is relieved by a
lunge by reason of the increased circulatory changes dependent
he bath.

use of a cold bath after a person becomes heated is popularly
ed to be dangerous. On the contrary, every athlete knows
othing is so refreshing and so preventive of muscular stiffness
evere exercise and sweating as a cold plunge or shower bath,
also recognizes the fact that a plunge is all that is permissible,
is only the person who posesses the healthy circulatory power
will enable him to rebound from momentary depression to
sed activity that should resort to such procedures.

l water dashed or sopped against the perineum or the scrotum
e lumbar region, is a favorite remedy for nocturnal seminal
ons with some practitioners, and the scrotum may be sub-
l in a tumbler of cold water for a few minutes at night for a
r purpose.

ery useful treatment of dysentery is to inject gently into the
about one or two quarts of cold water; if necessary it may be

icy cold, and a similar application for piles is a useful adjunct to all forms of treatment for these troublesome formations.

So highly do some physicians praise this method, that the writer has thought it proper to quote from a paper of Dr. J. William White, Professor of Clinical Surgery in the University of Pennsylvania, upon this subject. He says:

"I desire to call the attention of the profession to a method of treatment which, although not altogether new, is yet not appreciated as, in my judgment, it should be. I refer to a moderately forcible stream of water of varying temperature in the treatment of a number of affections of the rectum, anus, and genito-urinary apparatus. The atonic and astringent effect of such a stream of water upon any living tissue is, of course, a well-understood fact, and has been employed in the arrest of hemorrhage, in the treatment of inflammation, and in various conditions. But it has only been in exceptional cases, and usually by the aid of more or less troublesome apparatus that it has been used in the class of cases to which I now refer.

"The bidet, as I have now for a few years prescribed it, should be of the variety which can be attached to the water-closet seat habitually used by the patient. It should have a nozzle capable of throwing a stream of about the calibre of an ordinary lead pencil or a little less. The head of water should be sufficient to make it impinge upon the parts exposed to it with enough force to excite there a little sensation of smarting or tingling. That degree of force will, for example, be sufficient to enable the patient to take an enema, or, if a female, to take a vaginal injection. The bidet pipe should be movable by means of a handle, so that the stream can be directed against any portion of the external genitals, the perineum, the anus, or the surrounding parts. It should also have connection with the hot and cold water supply of the house, so that the water may be used of any temperature which the physician may prescribe, or which the sensations of the patient may make desirable. Stop-cocks should regulate the size and force of the stream, and should be so placed as to be easily reached by the hand of the individual sitting upon the water-closet seat. Such an apparatus can be put in place by any experienced plumber, in any ordinary water-closet, at an expense of from fifteen to twenty dollars; and, in Philadelphia at least, the usual head of water obtainable even in third-story rooms is quite sufficient for all therapeutic purposes.

"The cases in which it may be desirable to use this method of treatment may be divided into two classes: First, those affecting the lower end of the bowel and its outlet; second, those involving the genito-urinary system. Among the first the most important are hæmorrhoids, internal and external, prolapsus ani, and slight cases of prolapsus recti; pruritus ani and eczema of the margin of the anus should also be included in this group of cases in which it has now for some time been my habit to prescribe the systematic employment, twice daily, of the bidet, once immediately after the daily stool, and for the second time, by preference, just before going to bed. As a rule, in all the mid-winter months, the ordinary temperature of the Schuylkill water is that to be preferred, although I am largely governed by the feelings of the patient in this respect. An enema should be taken at each of these times, the lower portion of the rectum being thus thoroughly washed out at least twice daily, after which the stream of water is allowed to play upon the affected region for a period of from five to fifteen minutes. The ordinary and useful effect of cool sponging or washing immediately after stool in cases of hæmorrhoids is by this means enormously increased. Internal hæmorrhoids will under this treatment, in many cases almost entirely disappear, unless they are exceedingly large and have been frequently inflamed or strangulated and badly neglected; external hæmorrhoids, even when fleshy, will shrivel and become scarcely noticeable.

"I could detail a number of cases of this character taken from my practice of the last two years. In some instances in which I had been habitually called in, at intervals of a few months, in the case of old people the result has been practically their disappearance from my list of patients; and they speak in the warmest manner of the great comfort derived from this simple method of treatment.

"Perhaps nothing is more distressing among minor affections than the trouble described as pruritus ani, and variously attributed to liver disease, constipation, gastric troubles, latent gout, uterine disease, parasites, neuroses, and a number of other causes, varying from eating of shell fish, or excessive smoking, and to alleged hereditary predisposition. There are very few practitioners of any experience who have not discovered how difficult it is in any particular case of pruritus to assign distinctly the annoying symptoms to any one of these causes. Often the whole list may be carefully gone through and eliminated, or the proper remedies may be applied successively, as different theories are adopted without the slightest benefit resulting. Ointments, lotions, and ordinary cool bathing will be tried in great variety but without avail; and such patients will often go from one physician to another, or fall into the hands of quacks while seeking relief. My list of cases of this character, which I have now treated by means of the 'bidet,' comprises eight.

"Nearly all my cases have resulted in cure; requiring to attain that end simply different lengths of time of the application of the douche, with variations of the temperature of the water, and occasionally the use of some emollient salve. I have been particularly struck by the fact that these cases include among their supposed causes widely distinct conditions, and the uniformity with which they have yielded to this simple treatment has led me to regard with suspicion the orthodox etiology of the disease. In procidentia ani, and in slight cases of prolapsus recti, I have had very satisfactory though, of course, less striking results. In a few instances the trouble almost entirely disappeared, and in all of them it was distinctly relieved. These cases require for their successful treatment a much longer application of the douche, and the water should, in my judgment, be at one or the other extremes of temperature—either quite cool, or as hot as can be comfortably borne.

"I am quite aware that the use of cold water in these affections is not in the least a novel plan of treatment; but the method under consideration combines the effects of temperature with a sufficient force of the stream, and admits of the prolonged application of the remedy without effort on the part of the patient, who is in the most suitable position for this treatment, practical points which induced me to make this mention of my results in rectal and anal cases.

"Agnew says of pruritus, that among the local remedies frequent ablutions with cold water should be mentioned; and of prolapsus ani et recti, that 'in all cases where remedies have proved unavailing, or where patients have declined an operation, much good may be done by douching the parts with cold water and applying an oiled compress;' and Allingham says of the same class of cases, that 'the frequent and bountiful application of cold water is to be most strongly recommended;' but few authors, so far as I know, have especially alluded to the method of application by means of a bidet.

"My second class of cases includes, chiefly, certain prostatic troubles, varicocele, atonic impotence in the male, and pruritus of the vulva or vaginitis in the female. In cases of varicocele, although I have not succeeded in effecting a cure in any instance by this method, I have certainly seen advancing enlargements of the spermatic veins becoming stationary; long relaxed and pendulous scrotums become firm and much smaller; and the mental condition of the patient, which is so important an element in many of these cases, share in the improvement. In chronic prostatitis, a most intractable and distressing ailment in many instances, it has come to be a part of my routine treatment to order the use of cold perineal douches by means of the bidet, associated with frequent cool enemata given in the same manner; and I believe to-day that if I had to discard all therapeutic measures but one in these cases, I would retain this one. In a certain number of cases of impotence, associated with general muscular weakness, loss of tone, lack of general strength and vitality, accompanied by imperfect or rapidly subsiding erections, I have found that the cold douche applied with some force and for considerable lengths of time to the perineum and testicles has been productive of marked benefit.

"In two cases of pruritus vulvæ my results have been good, though less striking than in similar disease affecting the region of the anus. In vaginitis, where the woman has sufficient intelligence to learn how to take an injection by means of the bidet, it offers an admirable method of cleansing the vagina, of carrying away thoroughly all accumulated secretions, of reducing heat and swelling, and at the same time of avoiding the frequent introduction into the inflamed canal of a foreign body in the shape of the nozzle of a syringe. My opportunities for observation in this class of cases have been limited, owing to the disinclination of these patients to procure the bidet and owing to their irregular habits of life and their frequent changes of residence; but I have seen enough of its good results to make me feel confident that it is a valuable addition to our therapeutic agencies.

"After all, in every one of the cases which I have mentioned, its use is simply the application of the most elementary and common-sense principles to every-day practice, but I am satisfied that this particular method of applying these principles has not received the attention which it merits."

Cold in Fevers.

The proper manner to employ cold in fever should be thoroughly understood. It may be used at a number of temperatures according to the effect desired, such as cool, moderately cold, and very cold.

Very commonly in the course of a fever the patient is restless, uncomfortable and sleepless, yet has not a temperature fraught with any harm. Such a case may be sponged off with tepid water or with a little alcohol and water, or salt and whiskey, with great benefit in the production of sleep, the reduction of fever and the advantage of nervous quiet. Sometimes the sponging is successful when only used over the arms and legs, but more frequently it should be extended at least to the spinal column.

If tepid sponging does not lower the fever in a given case, then ordinary cool tap-water should be employed, and it is well to remember that the secret of successful sponging lies in the use of a sponge not saturated to overflowing but only sufficiently wet to leave a thin film of moisture on the skin which cools the patient by its rapid evaporation and does not wet the clothes and the bed. When cool water fails ice-water may be used, and a cloth wrung out in ice-water and several folds in thickness be laid over the chest and abdomen. When this is done this part of the body should be at first sponged with cold water to lessen the shock. It should be remembered, too, that cloths so applied become rapidly warmed by the heat of the body and should be constantly renewed.

There are many cases where sponging even with ice-water fails to reduce the fever, and in these the fever must be lowered by the "cold pack," as it has been called. The name is unfortunate as it is indicative of a very severe exposure. The application is carried out as follows:

A small canvas cot should be placed by the side of the bed of the patient and covered by a large rubber cloth which, by being raised at the head and depressed at the foot, forms a channel for the water. Over this again is placed an ordinary sheet. The patient after being stripped is laid upon this sheet which is then folded over him and a fine spray from an ordinary watering-pot for flowers allowed to play upon the body from end to end. The temperature of the water depends upon the effect required. The bed should be so arranged that the water will not remain in puddles under the patient but drain off constantly into a bucket at the foot. The sheet being wet causes evaporation to go on and a rapid fall of fever results.

During this procedure the thermometer should be placed in the mouth or deeply into the rectum, and the temperature watched. As soon as it reaches 101° or 100° F., the bath must cease, lest the fall continue and collapse ensue.

On the removal of the patient the surface should be gently dried with towels, and the bed clothing consist of only a sheet, or a sheet and one blanket in cold weather. Above all things it must be remembered that the patient is not to be *wrapped up* in a blanket, and not only this, but that he must not be placed in a blanket while still in the wet sheet. The wet sheet is only cooled by evaporation, and if surrounded by a blanket is a typical Russian or warm moist bath calculated to raise, instead of lower the fever.

Where sunstroke (thermic fever) is present the patient may have chopped ice applied or be put directly into a bath-tub of ice water.

The treatment of hyperpyrexia, due to rheumatism by cold, is quite as suitable as the treatment of other fevers whenever the hyperpyrexia is so excessive as to endanger life.

The presence of pneumonia and bronchitis does not seem to contra-indicate the use of cold in fevers, and no fear of "cold" being taken need exist, unless the bodily temperature is lowered below the normal point or to a few degrees above it. According to Liebermeister. intestinal hæmorrhages contra-indicate the use of cold, but this statement has been contradicted by no less a writer than Wunderlich.

COUNTER-IRRITATION.

Counter-irritation is a term applied to the use of substances irritating to the surface with which they come in contact, and employed for the purpose of influencing morbid processes in more or less distant parts, or of affecting the general system. It has been thought that this method savors of the doctrine of "like cures like," but in reality it is based on sound physiological laws and is so logical as to have been described by the founder of homœopathy as useless.

The entire basis for the employment of counter-irritation rests upon reflex action or the conduction of a nervous impulse to a centre which, when so stimulated, sends out an impulse to the part of the body which is diseased.

The use of counter-irritation may be divided into four parts or purposes. The first for affecting inflammations or congestions, the second for causing the absorption or removal of inflammatory deposits after true inflammation has ceased, while the third purpose is for the relief of pain, and the fourth for the effect which can be exercised upon the general system by blisters in systemic disease.

In the same manner that we can divide the indications for counter-irritation into four parts so can we also divide its forms into three varieties according to their severity. The most severe are the caustics or escharotics, the next the epispastics or blisters, and finally the rubefacients or reddeners.

The proper manner of employing a counter-irritant to affect inflammations is not to apply it directly to an inflamed area, but a little to one side of it, or at a spot known to be connected intimately with the diseased area by nerve fibres.

Thus it is well known that in diseases of the eye the blister should be applied back of the ear, and that in abdominal neuralgia or in pleurodynia the best results are reached, not from the application of a blister to the spot where the pain is felt, but to the point upon the vertebral column where the nerve at fault takes its exit. The reason for this is that pain is always referred to the peripheral end of an irritated nerve, and pleurodynia or abdominal pain often arises from vertebral disease or inflammation about the spinal ligaments or the foramina of exit for the nerves. In a similar manner we apply a blister sometimes in the early stages of hip-disease, not to the knee or ankle, where the pain is felt, but at the seat of the trouble, namely the hip. Counter-irritation is contra-indicated by the presence of any acute inflammation directly under the spot where it is proposed to place a blister. That is, if any reddening of the skin is present the blister or other form of irritation must not be applied there. If used at all it must be some little distance away or a series of small flying blisters placed around it. A flying blister is one which is small in area, say as large as a lima bean, and of comparatively slight action, healing rapidly after its effects have passed by.

Among the inflammatory affections in which we find counter-irritation most serviceable may be mentioned pleurisy, pneumonia, iritis, synovitis, rheumatic or traumatic, cerebritis and peritonitis acute or chronic. A host of more subacute or chronic inflammations are also benefited by this measure, some of which are gleet, chronically enlarged joints, and inflamed glands. In all these states the blister or, more rarely, the rubefacient is to be resorted to, and while it is true that nearly all of these conditions are accompanied by fever and that fever is generally held to be a contra-indication to the use of counter-irritation, blisters undoubtedly do good at such times. In pneumonia or pleurisy along with the use of veratrum viride a cantharidal blister of the size of a silver dollar should be applied near the spot where the most pain is felt or on the back near the spine. Where joints are inflamed, the blisters should be at some distance from the seat of the swelling, although it is often useful to place the counter-irritant on the inner or outer aspect of the knee-joint if the skin is not reddened. In peritonitis the blisters are best applied directly over the seat of tenderness, and in cerebritis at the nape of the neck. In gleet a little cantharidal collodion may be painted along the under surface of the penis or upon the perineum with great advantage in obstinate cases

Where inflammation is chronic and resists cantharidal blistering, then resort is often had to more severe forms of counter-irritation by means of the red hot, *not* white hot, iron, or the use of escharotics, such as caustic potash or soda, or arsenic. The reason for using these is that they all cause so much tissue-change in the part that the counter-irritation is very prolonged. Sometimes antimonial ointment is applied constantly, until a slough forms, to accomplish the same purposes.

For the removal of the productions of inflammation we resort to cantharidal blisters or drugs possessing powers as local irritants and at the same time as alteratives. Thus in pleurisy with effusion it is very proper to employ a good sized cantharidal blister if the effusion has a tendency to remain unabsorbed. Some have thought that the absorption which follows is due to the abstraction of serum which takes place in the bleb formed, but this is a mistaken idea, as one often sees an effusion absorbed which far exceeds in quantity the amount of liquid in the blister. Under these circumstances the spot for applying the blister is generally immediately under the arm about two or three inches below the axilla. The blister, while it is useful in causing absorption in chronic effusions and deposits about joints, is not so good as are alterative irritants, for example, as iodine, which, in the form of a thorough application at one sitting, until the skin is black, not yellow or red, is often of service. In other cases, particularly in very chronic states, iodine ointment alone or with lard may be rubbed into the parts with advantage, care being taken to stop its use for a day or two as soon as the skin gets red. This same treatment is also useful in treating enlarged glands in the neck and elsewhere.

One of the best treatments for epididymitis is to paint the scrotum black with many coatings of a strong solution of silver nitrate or iodine, to insist on total rest in bed, and to resort to the local use of cold. The testicles should also be supported during this treatment and aconite given if fever is present.

For the relief of pain we very commonly resort to the rubefacients rather than epispastics, since the more moderate applications are equally effective in most instances and do not leave evil effects behind to remind the patient of his attack.

Every one who has had stomach-ache and remembers the relief obtained by the use of a mustard plaster or spice plaster, recognizes the value of this means of obtaining relief, and it only remains for the writer to state that headaches are often amenable to similar treatment. These headaches may be neuralgic or due to dyspepsia or to cerebral anæmia or congestion, but counter-irritation will nevertheless do good. If neuralgic, a little menthol or oil of peppermint may be applied over the course of the nerve, which application, if the pain be supra-orbital, will require care lest the oil gain access to the eye.

For the treatment of pain in the belly or chest or elsewhere we have four methods of applying counter-irritation in the shape of rubefacients. The first is mustard, the second, capsicum; the third, the spice poultice; and the fourth, the turpentine stupe.

The mustard plaster should be made by mixing mustard flour with warm vinegar or water, and adding varying proportions of ordinary flour to modify its action. If the skin is tender, half mustard and half wheat flour may be employed, or, if a child is to be treated, the proportion may have to be one-fourth mustard. The plaster is made by placing a newspaper on a table and putting over it a piece of heavy muslin or linen. On this is smeared the mustard, and over the mustard mass is placed a more or less thin piece of linen, which prevents the poultice from adhering to the skin and modifies the burning according to its density. By folding the edges of the newspaper so that it resembles a picture frame we have at hand a cheap, effective and strong plaster, the back of which is supported by the newspaper.

The spice plaster is made by mixing equal parts of allspice, cloves, cinnamon, nutmegs, and adding thereto one-half part of black pepper. These constituents are made into a homogeneous mass by using a knife-blade to mix them, and are then sewed up in a bag which is quilted to prevent sagging of the contents. One side of the poultice is now wet with warm brandy, whiskey, or vinegar, and applied to the part desired.

If the skin is tender, the proportions of pepper and cloves should be decreased.

This plaster may be allowed to remain on the parts for hours or even days, and is very useful in gastric catarrh and indigestion, particularly that occurring in children.

The turpentine stupe (see Turpentine) is not to be allowed to remain too long, as it may blister a tender skin, and the pepper plaster may be so active as to produce unbearable pain if it is not watched.

The proper way of treating all such burns from counter-irritation is to apply simple cerate, cosmoline or sweet oil, to which may be added carbolic acid in the proportion of 1 to 100. The carbolic acid not only acts as an antiseptic but as a local anæsthetic, while the oil acts as a protective from contact with the air.

Much difference of opinion exists as to the proper treatment of the blister formed by cantharides. Where the blisters are small—that is, the size of the end of a finger—they may be allowed to break themselves, and then dressed with dry cotton. If there are large blebs they should be punctured at their most dependent part with a needle and dressed with dry absorbent cotton, as by so doing the new skin forms rapidly underneath and is soon able to carry on its normal functions.

The proper treatment of the blister while it is forming is to apply a poultice, which will decrease the pain and aid in the formation of the bleb.

DISINFECTION.

Before discussing the subject of disinfection we must turn our attention to what we mean by the terms employed when speaking of this subject in general. At present we recognize universally that the word germicide is a term applicable solely to agents capable of killing the lower forms of life, whereas antiseptics are substances which simply render the material with which they come in contact so antagonistic or unsuited to germ development as to render their presence for any length of time impossible, at least in an active state. To use a simile, the killing of the inhabitants of a district by shooting them would stop all growth and be germicidal, whereas the destruction of crops in these same parts would only be antiseptic; or, in other words, the people might remain, but would either have to go elsewhere or starve to death. (See article on Antiseptics.)

We now speak of germicides as disinfectants, but never of antiseptics as disinfectants, if we use these terms correctly. Germicide and disinfectant are therefore synonymous words.

From what has just been said it is evident that we should always resort to disinfectants rather than antiseptics, for although the latter are good the former are better.

We have three ways of destroying germs which are particularly useful. The first is the total destruction not only of the germs, but also of their resting-place, by means of fire, which may be used in the case of old furniture, mattresses and similar materials, and which may be extended to everything about the patient, if it is necessary to stamp out a brisk epidemic before it can get well under way. The second is the use of moist heat in the form of superheated steam, or, better still, for common purposes the use of boiling water; and, thirdly, by disinfectant materials which have a proved reliability.

Moist heat in the form of superheated steam is infinitely preferable to dry heat, but as superheated steam cannot be readily obtained physicians usually direct the clothes to be boiled for at least two hours.

Very often the bed-clothes are taken from a sick-room, trailed through the house, and finally deposited somewhere until a convenient time for boiling them occurs. This is distinctly wrong and capable of causing a widespread distribution of the disease. In all such cases the bed-clothes should be rolled off the bed in a bundle and completely submerged in a bucket or tub of boiling water, or better still in a corrosive sublimate solution of the strength of 1 to 1000, before they are taken from the room. This tub is now to be carried at once to the fire and the clothes lifted out dripping wet and plunged into a clothes boiler in which the water is actively boiling. The lid of the boiler is at once to be put on to increase the heat and prevent any germs escaping in the steam or in the hot air which arises from the surface of the water. The active boiling should be continued for one or two hours and water continually added to prevent scorching of the contents of the boiler.

It is important that food be not cooked on the same stove at the time the clothes are being boiled, and no food should be in the room.

If boiling cannot be used for any reason a 1 to 500 solution of corrosive sublimate may be tried or 1 to 20 of carbolic acid, although neither of these is so sure a method of disinfection.

The proper care of a room after it has been occupied by a case of infectious disease is of great importance and is generally sadly mismanaged. Very commonly sulphur is burnt, and as commonly employed this is perfectly useless, owing to leaking windows and doors which permit most of the generated gas to escape.

To be of any value the burning of sulphur must be preceded by packing the window cracks and door cracks with cotton or soft paper. The sulphur is then to be placed upon an iron pan under which is placed an alcohol or coal oil lamp. As the iron becomes heated the sulphur gives off its fumes. In other cases the broken rolled-sulphur is moistened with alcohol and lighted, but this is not so cheap or effective as the method first named.

By far the best method is to take all movable objects out of doors in the fresh air and then wash the floor, sills, and casings, using a scrubbing brush, hot water, and soap. This water should afterward be boiled to kill the germs which may be in it. After this is done the same surfaces should be scrubbed with a solution of corrosive sublimate (1 to 500 or 1 to 1000), and left wet so that the salt of mercury may remain on them. Cracks and crannies are to receive particular attention. If corrosive sublimate cannot be used then carbolic acid (1 to 10 or 1 to 20) may be resorted to.

By far the best disinfectant for all diseases is good ventilation. Not only should as much air as possible be allowed to enter the sick room, but after the case has vacated the premises the windows should remain open for weeks, if possible. Fresh air dilutes germs as fresh water dissolves or dilutes dirt.

Disinfection of the discharges of ths patient is an important point to be remembered. The urine and fæces should always be received in a vessel already containing enough corrosive sublimate solution (1 to 500) to kill all germs and to prevent their escape into the air or into water or food when thrown away. *The disinfectant should be placed in the bed-pan before, not after, it is used.*

The bed-pan or chamber should not be allowed to stand in the room, but be removed and emptied at once in such a manner that it cannot contaminate any water or food. It should not be thrown upon the ground, as the air will dry it and cause the germs to fly in the form of dust anywhere and everywhere. In very contagious diseases bathing or swabbing off the patient with weak antiseptics may be tried. Thus 1 to 10,000 of bichloride of mercury may be used and the case wiped off with a wet towel.

The question as to which are the best disinfectant substances is one which has attracted the attention of physicians and original investigators for years. The result of a vast amount of study and experience shows that corrosive sublimate is the best of all disinfectants in the proportion of 1 to 250 to 1 to 500, or even weaker, and that for cheapness, activity, and general usefulness chlorinated lime is better still. The disadvantages in the use of corrosive sublimate lie in its ready decomposition, its formation of an albuminate when albumen is present, its uselessness where lead pipes are present, and above all its expense. Chlorinated lime depends entirely upon its chlorine for any disinfectant power which it may contain. Chlorine gas is not readily handled but the lime enables us to put it where we will. It cannot be employed to disinfect colored fabrics as it bleaches them.

Whenever chlorinated lime is bought the physician should see that all its chlorine has not departed from it as most of the material kept in the stores is so old as to be worthless.

For scrubbing floors chlorinated lime may be made into a solution by adding a cupful to a bucket of water, and in privies it may be spread thickly over the surface of the mass of filth.

It is useless to place chlorinated lime around the room for the purpose of disinfecting the air as the amount of chlorine to the volume of air to be disinfected is as nothing.

Copperas, or sulphate of iron, while largely used as a disinfectant is only an antiseptic.

HEAT.

Heat is used locally for a number of purposes in the same manner as is cold, and, as was stated in the article on cold, the choice of heat or cold, in the treatment of any acute form of inflammation, depends almost entirely upon the desire of the patient, who generally can tell at once which will give him the greatest comfort.

In sprains of the ankle nothing compares to a hot foot-bath prolonged for hours, the object being to decrease the pain and swelling, thereby obtaining the rapid use of the limb. To carry this out effectively a piece of rubber tubing of small size should be led from a wooden bucket, which being a bad conductor of heat prevents the water from being chilled, to a sink or large tub near by, and by starting the water by suction a continuous but very small stream can be made continually to leave the bucket, while by means of another similar arrangement running either from another tub or, better still, from a hot-water spigot, a small stream of hot water continually enters to take the place of that withdrawn by the first siphon. Under these circumstances a very constant temperature of the water can readily be obtained, the high degree of heat borne, by gradually increasing the temperature of the water in the supply tube, is very extraordinary, the favorable results obtained being in direct ratio to the excess of temperature. Between these soakings the part should be dressed with lead water and laudanum, and rubbed now and then with camphor liniment containing laudanum.

In spasmodic affections involving either striped or unstriped muscular fibre the local application of heat is a very useful means of relief. Sometimes in lumbago or muscular stiffness in other parts of the body the use of an ordinary laundry iron over the affected part will prove of great service, the skin being covered by several layers of newspaper to afford a smooth surface over which to pass the iron and to protect the parts from too great heat.

Ironi

In chordee the best means for rapid relief, other than the use of drugs or general relaxants, such as amyl nitrite, is to steep the penis in hot water and to take a hot sitz bath before going to bed, which is a good prophylactic against this painful complication of gonorrhœa

In croup of the spasmodic type the local application of a hot compress, made by wetting spongiopiline with hot water, is very useful, or if spongiopiline cannot be had several layers of flannel should be so wetted, placed on the neck, and covered with cotton and oil silk to prevent its becoming chilled.

Where attacks of dysmenorrhœa depend upon spasmodic closure of the cervix, with corresponding spasm of the fundus uteri, a hot sitz bath or vaginal injection is useful, and this treatment is also of value where uterine congestion results in leucorrhœa or a sensation of weight in the pelvis. Sometimes attacks of torticollis may be subdued by applying hot compresses to the sterno-mastoid muscle.

In universal or partial spasm of the body, as is well represented by chorea, a hot pack is of great service, and it is to be used in the following manner: The child having first been stripped of all clothing is placed upon a bed covered by a rubber blanket and immediately wrapped in a woollen blanket which has been dipped in hot water and the excess of water wrung out of it. Over this wet blanket is immediately wrapped a dry one to retain the heat, and very soon the patient begins to perspire freely. Care should of course be taken that the temperature of the patient does not rise too high before sweating comes on. This hot pack will sometimes quiet a case of chorea which has resisted all forms of treatment so far as drugs are concerned. Cases of insomnia are often benefited by a similar experience, or mild cases of sleeplessness will occasionally rest quietly after an ordinary hot bath.

A wet pack which speedily becomes a warm one is used in cases where, during the course of an eruptive fever, the eruption fades and it is desired to bring it out again on the surface. It is also useful in the cases of severe chorea when the child can stand the first shock of the cold. It consists in wrapping the child in a cold wet sheet and over this wrapping one or two blankets. In a few minutes the sheet becomes heated from the body and the sweating which results is profuse. Cold may be applied to the head to relieve cerebral hyperæmia and to prevent overheating.

The use of heat in two forms has been and is largely used at present for medicinal purposes when the kidneys or skin is torpid to aid in the elimination of impure and effete materials from the blood and tissues. These two forms of heat, the dry and the moist, are commonly called the Turkish and Russian bath respectively, and may be taken under home arrangements or in one of the establishments found in all large cities.

The first of these is in the form of dry heat, the second is moist heat. The Turkish bath consists of a series of rooms ranging in temperature from 100° F. to 150° F. or more, into which the individual passes successively until the hottest room is reached. In each chamber he lingers until the system becomes accustomed to the high temperature, and perspiration is well established before he enters the hottest room, where he remains for a varying length of time, according to the advice of his physician or his own whim or comfort. The rule governing his stay is that he must leave it at once if any sense of oppression is experienced or if perspiration does not freely flow. Sometimes a glass of cold water taken at this time causes a sudden profuse sweat and also relieves any overheating by abstracting many units of heat. The cold water in the centre of the body causes contraction of the bloodvessels in these parts and the blood rushing to the surface causes the sweat glands to pour out their secretion.

Following the stay in the warm room the individual passes into still another chamber where he is shampooed from head to foot, well rubbed, and the blood made to circulate through the skin. The shower bath is then used, at first hot or warm and finally changed to a dash of cold, or better still the patient plunges into a long tank, swims to the other end and is there met by an attendant who rapidly dries his skin, wraps a cover round him, and shows him to a lounge, where he is supposed to recline and sleep for an hour or less.

The air of this sleeping room is at the ordinary temperature of a living room.

Reviewing for a moment the effects of this bath we find that the first two-thirds are devoted to the opening and stimulation of the pores of the skin, while the last third is devoted to the contraction of these pores and their supplying bloodvessels. In other words, it is necessary to use the cold to prevent gradual chilling of limited areas, which would result in internal congestion. If the patient receives a cold douche the natural rebound prevents congestion of a permanent nature, whereas if he is exposed to cold a long time these stagnated areas become permanently diseased. The physician must always remember that this cold douche or plunge is a *sine qua non*, and that a rest after the bath before dressing is almost equally important. If the patient is too weak to bear the cold he must not use the bath.

The indication for the Turkish bath, as a medicinal measure, is any condition of the emunctories of the body whereby effete matters are not properly eliminated, as in Bright's disease in its various forms. The increased action of the skin not only for the time being casts off impurities, but the frequent repetition of the bath causes functional hypertrophy of the sweat-glands, and eventually enables them to do more work or, in other words, to cast off more effete materials. As a consequence of this the patient is able to avoid uræmia or other evidences of Bright's disease, and using the normal epithelium still left in the kidney for constant use employs the bath once, twice, or thrice a week with the object of abstracting the excess of impurities which the impaired activity of his kidneys cannot remove. The frequency of the bath depends, therefore, upon the rapidity with which the effete materials accumulate. In cases of Bright's disease the patient should not attempt to use the room containing high heat at first, and should be accompanied by a medical attendant to watch for untoward effects, particularly if the heart is diseased or uræmia is already shown by headache or other signs. If sweating does not come on at once danger is at hand from acute uræmia, renal and cerebral congestion, or heat-stroke.

Not only is the Turkish bath useful for kidney disease, but it is often of great service in rheumatism. The acute form of rheumatism is rarely so treated, because cardiac complications often prevent exposure to heat. In subacute and chronic rheumatism the case is different, and the enlarged joints or inflamed muscles yield like magic in some cases to such treatment. Further than this, the muscular stiffness following prolonged or severe effort can be so put aside, and neuralgia depending upon rheumatic or gouty taint may be relieved by the hot-air bath. Acute colds in the head or elsewhere, if taken at an early formative stage, can often be aborted by a good Turkish bath and greatly relieved when further developed by the same means. If, however, congestion of the lung, pneumonia, or chronic bronchitis, with emphysema or dilated weak heart, exist, the bath may be dangerous.

In acute pharyngitis, in which the pharynx feels like a raw surface, or "as if it were filed or scraped," the bath will give relief in many instances.

Sometimes in suppression of menstruation from cold the flow may be restored by a Turkish bath.

Some persons exist who complain that they are always catching cold upon the slightest provocation, and sometimes apparently without cause. One class seem to have delicate mucous membranes readily susceptible to irritation and inflammation, the other have dilated or relaxed peripheral capillaries, which readily allow the blood in them to become chilled, and, consequently, cause internal local congestions. Two separate means of treating such cases exist. The first set will do well on minute doses of arsenious acid (grain $\frac{1}{100}$ to $\frac{1}{50}$) three times a day, used for weeks; the second will be cured of their habit by the use of a Turkish bath twice or thrice a week, since by this means the peripheral capillaries are toned up and made more active.

The Turkish bath, as thoroughly carried out in large cities, is not obtainable for those living elsewhere, so it is well to describe a home modification which, with attention to detail and care, may prove almost, if not quite, as effective a remedy.

The patient is placed upon a wicker chair, naked, and under the chair a small alcohol lamp is put, which is lighted. The individual is now wrapped thoroughly, chair and all, with one or two large blankets, and the heat of the lamp soon causes profuse sweating. Many cases are, however, on record where the lamp was upset and the patient badly burned. Indeed, the eminent physiologist, Dr. Carpenter, so met his death. The best way is to have a lamp a little to one side and its flame immediately under the mouth of an inverted funnel attached to a piece of tin tubing, the free end of which is placed under the blanket so that the hot air and vapor may surround the body. If the tube be covered with cloth the loss of heat is slight and the danger of burning the patient is removed. If this is not practicable several very hot bricks or stones, thoroughly heated in an oven, may be placed under the chair, or small heated logs may be substituted

The Russian bath differs solely from the Turkish in that the heat used is moist not dry. As a consequence the danger of heat-stroke and similar states is much increased, because evaporation from the skin does not go on so rapidly and the body is not cooled so well in consequence. In its place the patient may be given a warm pack which consists in wrapping him in a sheet and surrounding him with large blankets wrung out of water as hot as can be borne, which is in turn covered with a dry blanket to prevent cooling.

This method of treatment is useful in the same states as is the Turkish bath, but is more rarely used. The warm pack just named is also employed to develop the rash of any of the exanthematous fevers when it is suppressed by cold or is not "well out" on the skin. The temperature of the patient must be watched lest he fails to have sweating and develops heat-stroke in consequence. A thermometer should be kept constantly under the tongue during the use of the pack.

Whenever the Russian bath is used, except in the exanthematous fevers, it should be followed by a cold douche.

Although these baths have been used in heart disease to relieve dropsy and renal engorgement they are not safe and should not be generally employed. All acute or chronic diseases of the lung, except acute bronchitis of a mild form, contra-indicate their use.

Kalashnikoff has made a series of observations on the therapeutic effects of heat on syphilis, and especially on syphilitic eruptions, his patients being inmates of the St. Petersburg Lock Hospital for Women and Children. The heat was applied where possible by means of partial hot-air baths applied to the affected part for half an hour twice a day, the part being enveloped in hot flannel immediately afterward, and remaining so protected until the next hot-air bath. The temperature never exceeded 116° F. (46.6° C.). Where the eruption was on the back or neck or on some part which it was impossible to insert in a hot-air chamber, India-rubber hot-water bottles or tubes, through which the hot water was kept flowing, were employed. When both arms or legs were affected in a symmetrical manner the treatment was confined to one side, the other being left untreated for the purpose of comparison. The results showed that generally speaking the heat treatment acted very energetically and beneficially on syphilides, both when employed alone instead of mercurials and iodides, and also when used in conjunction with these remedies. Often heat proved beneficial when the ordinary specifics had failed. Among other observations it was noted that hard chancres healed and the induration disappeared in from 8 to 16 days; roseola and papular erythema disappeared in from 4 to 8 days; various forms of papular and impetiginous syphilides, with marked pigmentation, disappeared in from 8 to 21 days; non-ulcerated tubercles and gummata disappeared in from 7 to 24 days, but those which had already begun to ulcerate required from 1 to 6 weeks; periostitis was cured in from 10 to 24 days; ostoses were not affected; syphilitic ulcers, consequent on the breaking down of gummatous periostitis, required treatment of from 6 weeks to 3 months or more, while necrosis of bone frequently required many months' treatment before the sequestra could be got away.

KATAPHORESIS.

By the term kataphoresis we mean a method resorted to by physicians having for its purpose the introduction into the body of drugs through the influence of electricity. Correctly speaking kataphoresis is an osmosis of medicaments through the tissues, the osmosis being carried on by the electrical current and the drug being carried through the tissues between the two poles. Quinine, iodide of potassium, the various soluble salts of mercury, and chloroform and ether may be so used. The ordinary sponges or absorbent cotton tips of the electrodes may be saturated with the medicament to be used, and the constant current employed, the current being reversed every few minutes. The positive pole of the battery is placed over the affected part, and the negative at a little distance away.

In cases of neuralgia, chloroform and alcohol, each one-half, or even pure chloroform may be employed, and in syphilitic nodules, when the patient's stomach cannot stand drugs, kataphoresis over the part affected, with iodides, may be resorted to. The iodide of lithium is commonly employed in the strength of 5 per cent. in these cases. The strength of the current depends upon the size of the electrodes and the sensations of the patient. It is not necessary to use a stronger current than the patient can bear with comfort.

VENESECTION.

Bleeding or Phlebotomy is so rarely practised to-day that very many of the profession have never abstracted blood for therapeutic purposes, or even seen it done by some one else. Furthermore, it is to be feared that many of the younger physicians would hardly know how to bleed if called upon to do so at a crisis. All this is wrong, for bleeding is a measure undoubtedly of the greatest value and one which every one may be called upon to resort to. Like many medical measures it was sadly abused in the early part of this century, and people were bled with the same regularity that they were put to bed.

The indications for venesection are as clear and well-defined as are the indications for any remedy. Briefly stated, we may say that all states of the circulatory apparatus denoting high arterial tension and excitement are indications, and that weakness, low arterial tension, and systemic or circulatory depression are contra-indications. Since the use of veretrum viride has become more common the conditions indicating venesection have been lost sight of because this drug so dilates the blood paths that a man is bled into his own vessels.

Having made clear the general indications for the use of venesection, we may pass on to state some of the diseases in which it may be well resorted to. Of these, pneumonia, pleurisy, meningitis, and peritonitis, if they are sthenic, are typical examples, since all of them are accompanied by arterial excitement and characterized by local congestions affecting the lung, pleura, cerebral membranes, or peritoneum. (See Pneumonia.) By the abstraction of blood the vascular tension is lowered and the engorged area relieved. In the first place, the congested area is made up of relaxed bloodvessels, whereas the remaining bloodvessels of the body are tense and, as a consequence, the blood is urged to the spot already engorged. In the second place, the abstraction of blood from the tense bloodvessels leaves the general pressure lower than that in the diseased area and the congestion is relieved.

In apoplexy the extravasation of blood into the brain causes great arterial excitement, as a general rule, and this in turn results in increased intracranial hæmorrhage. Bleeding is, therefore, strongly indicated, not only to prevent inflammation, but also to prevent further leakage into the brain substance.

The method by which venesection is practised is yet to be described, and it is a very simple operation if an assistant is present to make pressure on the vein or entire arm. Often this pressure is best exercised by means of a handkerchief or bandage tightly twisted about the arm above the spot where the incision is to be made. Under these circumstances the veins of the arm become prominent and distended and one of them may be gently bared by a short longitudinal incision of half an inch, the fascia being separated until the glistening, blue surface of the vessel appears free from fat or connective tissue. Into this vessel, with the edge of the knife turned upward, a small longitudinal incision is made, care being taken that the point of the blade is not driven in far enough to injure the posterior wall of the vein. If a clot forms and stops the flow it must be removed by an aseptic cloth, while if the flow is to be stopped we may remove the bandage above and apply a compress over the incised vein, which compress may be held in position by a bandage.

FOODS FOR THE SICK.

PEPTONIZED MILK.

TAKE a perfectly clean, clear glass quart-bottle and place in it the contents of one of Fairchild Bros., or Parke, Davis & Co.'s peptonizing tubes and a teacupful of cold water, and after shaking pour into the bottle a pint of perfectly fresh, cool milk and stir the mixture thoroughly. Next place the bottle containing the milk in a can of water at such a temperature that the whole hand of the nurse may be submerged in it indefinitely without pain. If complete digestion of the milk is desired, this application of heat may be continued as long as twenty minutes but in most respects five minutes is sufficient. If carried on longer than twenty minutes, the milk will become bitter and disagreeable to the taste through the development of peptone in excess.

Immediately after taking the bottle from the hot water it should be placed on ice, in order to check further peptonizing and to keep the milk from spoiling; or if ice is not available the water bath should be quickly brought to a boil, in order to prevent further action of the ferment and the bottle be then placed in a cool place. This recipe may be used where it is thought necessary to digest the milk before it is swallowed. Where we desire simply to aid digestion it is best to follow the directions already given, except that the bottle is not heated but at once placed upon ice and allowed to remain there, being slightly warmed when it is desired to give it to a child, or it may be given as a cool and refreshing drink to an adult, the heat of the body rapidly causing the ferment to do its work as soon as the food enters the stomach. Where irritability of the stomach exists in adults this peptonized milk may be made more agreeable to the taste by following the directions given in the first recipe, except that it must remain in the hot water for no less than two hours, when it is poured out into a tincup or pan and rapidly brought to the boiling point. After this it is strained through a piece of coarse muslin and placed upon ice. Before giving it to a patient this mixture may be flavored with lemon or orange juice or any form of acid that is desired, without the milk becoming curdled. Peptonized milk punch is made from milk prepared in the way already described in the first recipe, by adding St. Croix or Jamaica rum or brandy, particularly if the surface be sprinkled with a little grated nutmeg.

A very refreshing and agreeable drink may be made by diluting peptonized milk one-half with highly charged carbonic acid water and drinking it while effervescing.

apoll. water 1/3

Peptonized Beef.

The following method of preparing peptonized beef is recommended by the Fairchilds and is very useful, as is also peptonized oyster stew as first introduced by my late friend, Dr. N. A. Randolph, of the University of Pennsylvania:

Take ¼ pound finely minced, raw *lean* beef; cold water, ½ pint. Mix in a saucepan. Cook over a gentle fire, stirring constantly until it has boiled a few minutes. Then pour off the liquor for future use, and beat or rub the meat to a paste, and put it into a clean fruit jar with ½ pint of cold water and the liquor poured from the meat.

Add—Extractum Pancreatis (Fairchild)	20 grains.
Sodii Bicarb.	15 grains.

Shake all well together, and set aside in a warm place, at about 110° to 115°, for three hours, stirring or shaking occasionally; *then boil quickly.* It may then be strained, or clarified with white of egg in the usual manner, and seasoned to taste with salt and pepper.

For the great majority of cases it will not be required to strain the peptonized liquor, for the portion of meat remaining undissolved will have been so softened and acted upon by the pancreatic extract that it will be in very fine particles and diffused in an almost impalpable condition, and is, therefore, in a form readily subject to assimilation in the body.

Peptonized Oysters.—Peptonized oysters are prepared by mincing 6 to 12 large oysters and adding to them, when mixed with a moderate amount of their own liquid, 5 grains of pancreatin or peptonizing powder and 20 grains of sodium bicarbonate. The cup containing this mixture is now placed in warm water at 100° F. and allowed to remain there from ten to twenty minutes according to the degree of digestion desired. After this the liquid mass is quickly brought to a boil to cook the oysters and stop digestion, and served with pepper and salt as required. Any condiment or flavoring may be used.

Peptonized Gruel.

Peptonized gruel may be made by taking thoroughly boiled hot gruel made from oatmeal, barley, wheat, or from arrow-root, to the amount of ½ pint, and adding thereto while it is hot, ½ pint of fresh, cold milk; to this may now be added the contents of one peptonizing tube and the mixture allowed to stand in moderately hot water or in a warm place for 20 minutes before it is placed upon ice.

KOUMYSS.

This is a preparation of milk largely used by children and adults during convalescence from acute or subacute exhausting diseases. Even young children of three or four years will take a fancy to it if it be not made too sour by continuing the fermentation process too long. The liquid is prepared as follows: Add to 1 pint of cool, perfectly fresh milk 2 teaspoonfuls of sugar and place, after shaking thoroughly, in a beer or claret bottle. Then add ⅛ of a cake of Fleischman's compressed Vienna yeast and tightly cork the bottle, standing it in a warm place or in a water-bath at 99° to 100° F. for eight to ten hours. Then place in a cool place or on ice and use as needed. It must be remembered that the development of carbonic gas is very great in this liquid, and that if an ordinary cork is inserted it must be tied in before the heat is applied. Further than this the cork must be pulled very gently or the liquid will squirt all over the room. The best thing to use when about to drink the koumyss is a "champagne tap," by means of which the liquid may drawn off as needed.

DIET LIST.

The following bills of fare are used in the Children's Hospital and in the children's department of the University Hospital in this city, with good results, and are easily prepared and the directions readily carried out by the inexperienced:

Diet in Gastro-intestinal Catarrh for a Child of Seven Years.

Breakfast, 7.30 A.M.: Milk, with lime water; 4 tablespoonfuls of lime water to each tumblerful of milk. The lightly boiled yolk of an egg, a thin slice of well-toasted bread, or stale bread.

Dinner, 12 M.: A mutton chop without fat, broiled, or a slice of roast beef or mutton, occasionally a bowl of meat broth. Stale bread or toast.

Supper, 7 P.M.: Milk and lime water. Stale bread or toast.

For drink: Filtered or boiled water.

Starch-foods to be avoided as much as possible.

Diet for a Child Two Years Old.

Breakfast, 7 30 A.M.: Milk. The lightly boiled yolk of an egg. Thin bread and butter (bread one day old)

Lunch, 11 A.M.: Milk. A thin slice of bread and butter.

Dinner, 1.30 P.M.: Beef-tea or small piece of minced roast beef or mutton devoid of gristle. One well mashed potato, moistened with gravy. Rice and milk.

Supper, 6 P.M.: Milk. Bread and butter.

For drink: Boiled or filtered water.

Diet for a Child One Year Old. (5 meals a day.)

First meal, 7 A.M.: Two teaspoonfuls of grated flour-ball in half a pint of milk (prepared as directed below).

Second meal, 10.30 A.M.: Half a pint of milk with 4 tablespoonfuls of lime water.

Third meal, 2 P.M.: The yolk of 1 egg beaten up in 1 teacupful of milk.

Fourth meal, 5 30 P.M.: Same as the first.

Fifth meal, 11 P.M.: Same as the second.

Flour-ball is to be made by taking 1 pound of good flour—unbolted, if possible—tie it up *very tightly* in a pudding bag; put it in a pot of boiling water early in the morning, and let it boil till bedtime, then take it out and let it dry. In the morning peel off from the surface, and throw away, the thin rind of dough, and with a grater grate down the hard, dry mass into a powder. To use this, take from 1 to 2 teaspoonfuls of the powder, rub it down till smooth with a tablespoonful of cold milk, and add 1 tumblerful of hot milk, stirring it well all the time.

Diet for a Child from Six to Twelve Months Old. (5 meals a day.)

First meal, 7 A.M.: Mellin's food, 1 tablespoonful, or flour-ball grated, 1 or 2 teaspoonfuls (prepared as directed above), hot water, 4 tablespoonfuls; warm milk enough to make half a pint. Dissolve the Mellin's food or rub down the grated flour-ball in the hot water by stirring, then add the milk; mix thoroughly.

Second meal, 10.30 A.M., and third meal, 2 P.M.: A breakfastcupful of milk with 4 tablespoonfuls of lime water.

Fourth meal, 5.30 P.M.: Same as first.

Fifth meal, 10.30 P.M.: Same as second.

Beef Tea.

Take 1 pound of lean beef, and mince it. Put it, with its juice, into an *earthen* vessel containing a pint of *tepid water*, and let the whole stand for one hour; strain well, squeezing all the juice from the meat. Place on the fire, and slowly raise *just to the boiling point, stirring it briskly* all the time. Season with salt and pepper to taste. In administering this, always be careful to stir up the sediment.

Or, take two pounds of beef, without fat or bone, half a breakfast-cupful of cold water; place it in a jar in a sauce-pan of water. Simmer four hours.

Barley Water.

To prepare barley water, put 2 good teaspoonfuls of washed pearl barley with 1 pint of cold water in a saucepan, and boil slowly down to two-thirds. Strain.

Wine Whey.

Boil 1 pint of fresh milk; while boiling, pour in 1 small tumblerful of sherry wine (8 tablespoonfuls), bring it to the boil a second time, being careful not to stir it; as soon as it boils set it aside until the curd settles, and pour off the clear whey.

Almond Bread for Diabetics.

Take of blanched sweet almonds ¼ pound, beat them as fine as possible in a stone mortar; remove the sugar contained in this meal by putting it into a linen bag and steeping it for a quarter of an hour in boiling water acidulated with vinegar; mix this paste thoroughly with 3 ounces of butter and 2 eggs. Next add the yolks of 3 eggs and a little salt, and stir well for some time. Whip up the whites of three eggs and stir in. Put the dough thus obtained into greased moulds, and dry by a slow fire.

Bran Bread for Diabetics.

Take a sufficient quantity (say 1 quart) of wheat-bran; boil it in two successive waters for a quarter of an hour, each time straining it through a sieve; then wash it well with cold water (on the sieve) until the water runs off perfectly clear; squeeze the bran in a cloth as dry as you can, then spread it thinly on a dish and place it in a slow oven; if put in at night, let it remain until morning, when, if perfectly dry and crisp, it will be fit for grinding. The bran thus prepared must be ground in a fine mill and sifted through a wire sieve of such fineness as to require the use of a brush to pass it through; that which remains in the sieve must be ground again until it becomes quite soft and fine. Take of this bran powder 3 ounces (some patients use 4 ounces). The other ingredients as follows: 3 new-laid eggs, 1½ ounces (or 2 ounces, if desired) of butter, and about ½ pint of milk; mix the eggs with a little of the milk, and warm the butter with the other portion; then stir the whole well together, adding a little nutmeg and ginger, or any other agreeable spice. Bake in small tins (patty-pans), which must be well buttered, in a rather quick oven for about half an hour. The cakes, when baked, should be a little thicker than a ship's biscuit; they may be eaten with meat or cheese, at breakfast, dinner, or supper; at tea they require rather a free allowance of butter or may be eaten with curd or any of the soft cheeses.

"It is important that the above directions as to washing and drying the bran should be exactly followed, in order that it may be freed from starch and rendered more friable. The bran in its common state is soft, and not easily reducible to fine powder. In some seasons of the year, or if the cake has not been well prepared, it changes more rapidly than is convenient. This may be prevented by placing the cake before the fire for five or ten minutes every day."

Restorative Beef Essence. (*Ringer.*)

Take 1 pound of fresh beef, free from fat, chop it up fine, and pour over it 8 ounces of soft water, add 5 or 6 drops of hydrochloric acid, and 50 or 60 grains of common salt, stir it well, and leave it for three hours in a cool place. Then pass the fluid through a hair sieve, pressing the meat slightly, and adding gradually toward the end of the straining about 2 ounces more of water. The liquid thus obtained is of a red color, possessing the taste of soup. It should be taken cold, a teacupful at a time. If preferred warm, it must not be put on the fire, but heated in a covered vessel placed in hot water.

Should it be undesirable for the patient to take the acid, this soup may be made by merely soaking the minced beef in distilled water; or take 1 pound of gravy beef, free from fat and skin, chop it up very fine, add a little salt, and put it into an earthen jar with a lid, fasten up the edges with a thick paste, such as is used for roasting venison in, and place the jar in the oven for three or four hours. Strain through a coarse sieve, and give the patient two or three teaspoonfuls at a time; or cut up in small pieces 1 pound of lean beef from the sirloin or rump, and place it in a covered sauce-pan, with ½ pint of cold water, by the side of the fire for four or five hours, then allow it to simmer gently for two hours, skim it well, and serve.

Mulled Wine.

Boil some spices, cloves, nutmeg, cinnamon, or mace, in a little water, and add as much of this decoction as is necessary to flavor a wineglass of sherry, or any other wine. Add sugar to taste, and bring the mixture to a boiling point. If claret is used, it will require more sugar than if a less sour wine is employed. The vessel for heating the wine should be scrupulously clean.

PART IV.

DISEASES.

ABORTION.

THE treatment of abortion divides itself into three parts: the first to its prevention, the second to its arrest when threatened, the third to its proper care when inevitable.

In the preventive means we find, as in nearly every branch of medicine, that the use of hygienic measures is more important than the employment of drugs. If the previous abortions be known to be due to syphilis, endometritis, or uterine displacements these conditions must be treated by their proper remedies. If there exists no apparent cause for the interruption of normal gestation, the patient should use a simple diet, lead a quiet life, avoid all sexual intercourse, sleep on a hard bed, and resort only to gentle exercise. Fresh air is, however, a necessity and should be plentifully obtained. The food should be light, but nutritious and palatable, and a sufficient variety supplied to avoid any repugnance to a given dish. In many cases abortion rests upon deficient nutrition of the fœtus, either by reason of faulty assimilation on the part of the mother or because of poor food, and, if anæmia, debility, or other impoverished states of the maternal system be present, these should be treated at once. The clothing should be loose, the night's sleep undisturbed and of full length, and the mind be set as far as possible at rest in respect to household and other worries, and particularly diverted from the thought of possible uterine disturbance.

The use of drugs is to be limited strictly to the fulfilment of a distinct indication, and the employment of cathartics is to be avoided, the bowels being kept in order by fresh fruits in moderate quantity, or by mild laxatives, such as cascara sagrada in small doses and compound licorice powder. If these fail rhubarb may be resorted to and castor oil in capsule may be used. Podophyllin, senna in full doses, saline purges in active amounts, and aloes, are not to be used if they can be avoided. If the woman be exceedingly stout and plethoric saline purges are indicated to act as depletants. It is hardly necessary to add that elaterium and scammony, or jalap, are not safe, and can only be used if dropsy and ascites are present and where we must choose the least of two evils. Strychnine, which stimulates the spinal cord, should never be employed, and cantharides, oil of erigeron, and manganese ought not to be used unless they are for some reason very necessary. Although quinine is not of itself abortifacient, it is unsafe if an abortive tendency is present, and can only be used when the abortion is brought on by malarial poisoning, when it will act as a preventative.

The only drug which seems to be of any service as a prophylactic to be taken all through pregnancy is the fluid extract of viburnum prunifolium, the dose of which is ½ to 1 drachm. This drug is said to be a uterine sedative and to have no injurious effects upon the mother or child.

Cimicifuga racemosa is probably equally valuable as a prophylactic against abortion in the dose of 10 to 20 drops night and morning of a good sample of the fluid extract.

The arrest of threatened abortion is one of the most difficult duties which come to the physician, and there is no doubt that large doses of morphine or opium are the best means of quieting the uterus that we have. While viburnum prunifolium may be resorted to, we do not know enough of it to rest assured of its value, but it should be tried if opium is not at hand or fails. The patient should be at once placed quietly in bed in the most comfortable position, be lightly covered to prevent over-heating and taking cold, and receive by the hypodermic needle ¼ grain of morphine, or better still, an injection of warm starch water containing 30 drops of laudanum. The bulk of the injection should be small in order not to disturb the bowels, and must be at the bodily temperature. If this is not done a suppository of the aqueous extract of opium, containing ¼ to ½ grain should be used. Ice-cold drinks should be given and no tea or coffee allowed. This treatment quiets the uterus, allays nervousness and restlessness, and at least puts off the abortion for a few hours. Venesection has been practised in very plethoric women with advantage.

When an abortion is inevitable it is to be treated by measures directed to the avoidance of hæmorrhages, the thorough delivery of the ovum and its appendages, and the prevention of inflammation and septicæmia. For the prevention of hæmorrhage a number of balls of absorbent cotton tightly wound with thread to the size of a small egg should be packed into the vagina back of and around the cervix until the bleeding is controlled, and while a small amount of iodoform may be dusted over them before they are inserted, no astringents is to be applied unless it be tannic acid to coagulate the blood in the cotton as astringents cannot reach the bleeding spot. Sponges ought never to be used as they often fail to control the bleeding. By means of this packing the blood in the uterus cannot escape, and, as the uterine walls contract, they urge the liquid between the membranes, thereby causing complete separation. Ergot should be used after the tampons are applied in the dose of a fluidrachm of the extract or a tablespoonful of wine. Generally after twenty-four hours the removal of the tampons will show the ovum to be in the vagina, but if part of it remains in the uterus the following measures should be resorted to. The ergot should be withdrawn unless the hæmorrhages are severe and the uterine cavity is to be cleared by the use of the fingers of the attendant who grasps the membranes and draws them away. If the cervical canal is too small it must be dilated by dilators or by packing it with sponge tents. After the membranes are removed the tincture of iodine should be applied to the inner surface of the uterus as a hæmostatic, antiseptic, and alterative.

The after-treatment consists in the use of small doses of ergot and quinine, of vaginal antiseptic irrigation or even of uterine irrigation if it is needed, and the maintenance of perfect rest for one or two weeks, or longer if possible.

ABSCESS.

The medical treatment of abscess resolves itself into the use of drugs to prevent the formation of pus, to cause its fatty degeneration and absorption, to quiet the systemic disturbance if the inflammation be severe, and to support the body if the suppuration be prolonged, or in large amount, or if debility exists. The treatment may also be divided into that suited to acute and chronic abscess.

As acute abscess in its early stages is simply a localized inflammation with hyperæmia and an outpouring of leucocytes, it may often be aborted by the use of aconite or veratrum viride in full dose to quiet the circulatory excitement and relieve the congestion. This is particularly true where the pain is pulsating. At the same time, if the swelling is superficial, a poultice, made by moistening bread crumbs with lead water, should be placed over it, or lead water may be placed over it on lint and applied in this way. Belladonna ointment smeared over the same area may be of service, and the tincture may be used internally if aconite cannot be had. If a gland be involved the needle of a hypodermic syringe may be inserted obliquely into its centre and 5 to 10 minims of a 2 per cent. solution of carbolic acid injected into the swelling. This method has been found of singular efficacy in bubo where pus seemed just about to form. It is almost always curative, but should not be used in a stronger or weaker solution than that named. Another useful abortive method for the early stages of abscess is the application, externally, of a strong solution of nitrate of silver, 20 to 40 grains to 1 ounce of water, by means of a camel's-hair brush, all over the skin, covering the area involved, or by the use of the tincture of iodine in a similar manner.

Internally, sulphide of calcium in the dose of $\frac{1}{10}$ grain every hour or two, may be used as an abortive, or at least to promote arrest and cause absorption. If it becomes evident that pus is going to form, then resort must be had to poultices which by their heat and moisture will aid in the formation of pus by favoring the escape of leucocytes and by softening the tissues. If pus forms and fluctuation ensues the abscess should be freely opened, drained, washed out by a solution of carbolic acid, in the strength of 1 to 20, or of bichloride solution 1 to 5000 and dressed with antiseptic gauze. If it is tubercular the abscess may be opened in the ordinary manner, all diseased tissues removed by scraping and packed with iodoform gauze, or it should be drained by aspiration and an ethereal solution of iodoform injected and allowed to remain in the abscess cavity if a small one. The opening is now closed by a pledget of cotton wet with tincture of benzoin and an antiseptic dressing applied over it. Not more than 20 grains of iodoform should be so used in tubercular abscess.

A very good treatment for slow abscess is to wash out the cavity with a 10 per cent. solution of peroxide of hydrogen.

If the abscess is chronic (cold abscess) and associated with great weakness, resort must be had to the internal use of iron in the form of the tincture of the chloride, cod-liver oil, with hypophosphites, quinine as a tonic and to prevent hectic fever and the use of nutritious, easily digested food. Alcohol may be used and should be given with the milk.

The following tonic pill and solution are of service:

Too large
dose strych.
1/20 gr. indicated
use 1/64–1/12

℞.—Strychninæ sulph.	gr.iv.
Ferri redact.	gr.xv.
Quininæ sulph.	gr.xv.

M.—Ft. in pil. No. xx. S. One t. d. after meals, or

℞.—Tr. cinchonæ comp. Tr. gentian. comp. Tr. cardamom. comp.	āā f℥iij

M.—S. Dessertspoonful t. d. after meals.

Having described the means of treatment it is to be explained how these measures act. The aconite quiets the circulation and thereby relieves the inflammation, the lead water acts locally as an astringent and sedative, while the belladonna by its action on the bloodvessels contracts the dilated capillaries and allays pain. When carbolic acid is injected into an enlarged gland it acts as an anæsthetic and as an antiseptic to the germs always present, such as staphylococci, and as an astringent and stimulant. The nitrate of silver applications act by constringing the bloodvessels, as local sedatives and as counter-irritants. The iodine applications do likewise and also exercise an alterative influence.

The physiological action of the sulphide of calcium is unknown. The object in using the antiseptic irrigations is self-evident and the employment of iodoform in tubercular abscess rests upon the studies of Bruns, of Tübingen, and many others, who have found by experiment that iodoform is fatal to the bacillus tuberculosis.

As large numbers of corpuscles are destroyed in the formation of pus, and other sources of vitality are sapped by its formation, the use of hypophosphites and iron to replace the loss is necessary, and of cod-liver oil and tonics to increase the blood corpuscles and the assimilation of food.

ACNE.

This affection occurs in so many forms and arises from such different causes that a thorough consideration of its treatment cannot be here given; suffice it to state that arsenic is a remedy which will often cause a cure and prevent a relapse if used in small doses for a long period, that is: 1 to 3 drops of Fowler's Solution three times a day for a month or two. This is particularly useful if debility and anæmia underlie the disease. If the anæmia be marked, the proper treatment is that directed to the cure of this condition (see Anæmia); if obstinate constipation is present relief must be obtained by saline purges and the bowels kept in order by cascara sagrada or some similar drug. If scrofulosis exists cod-liver oil is of great service, or, if much pustulation is present, sulphide of calcium in the dose of $\frac{1}{10}$ to $\frac{1}{8}$ of a grain may be used in pill form three times a day. In menstrual acne sulphur may be used internally to open the bowels, and applied as a wash to the face in the following form:

℞.—Sulphur		ʒj.
Glycerini		f℥j.
Aq. rosæ	q s.	f℥viij

M.—S. Apply twice or thrice a day.

Or the following may be used in severe inflamed acne:

℞.—Sulphur iodidi	gr. xxx.
Ceratum simplicis	℥j.

Apply to the parts night and morning.

If the skin is very atonic, muddy, and torpid, it should be bathed night and morning with hot water and castile soap, or even with the tincture of green soap, and rubbed well with a rough towel.

If the green soap causes irritation some bland application should follow it, such as simple cerate or the emulsion of the oil of bitter almonds. If the pustules be large they may be incised and vent given to their contents, the sac being touched with a drop of carbolic acid. If induration is great, ichthyol ointment of the strength of 20 parts of ichthyol to 100 of lard should be well rubbed in, or resorcin, 10 to 20 grains to the ounce of lard, be applied. Mercurial ointment may also be used to relieve induration, but several days must elapse between its use and that of sulphur, as a black sulphuret of mercury may be formed and stain the face.

ADENITIS.

Adenitis is an inflammation of the lymphatic glands generally arising from scrofulosis, unless there be some specific trouble such as syphilis present. Less commonly it occurs in the neck from the irritation produced by the eruption of milk teeth, sometimes from blows or exposure to cold.

If the condition consists in a simple enlargement it should be treated by inunctions of iodine ointment and lard, half and half, night and morning, care being taken that the ointment is stopped as soon as any reddening of the skin appears, or if fluctuation develops. If the ointment cannot be used the tincture of iodine should be thoroughly painted over the swelling with a brush, but is less efficacious. Syrup of the iodide of iron in the dose of 5 to 10 drops is to be given if the patient is a child, and tonics must be used to improve the systemic condition. As soon as fluctuation or reddening shows the formation of pus all this treatment should be stopped and a poultice be applied and kept on for twenty-four or forty-eight hours till the swelling goes down or is ready for lancing. Lancing is better than allowing the abscess to break, as the scar left in after years is a mere line instead of a large cicatrix.

If the enlargement be scrofulous the following treatment, recommended by Treves and Grünfeld, is of value, and should be performed if the patient will submit to it.

The entire removal of the glands should be effected by dissection alone; directors, handles of scapels, or fingers should be used to separate the glands from the surrounding cellular tissue as closely from the capsule as a nerve is cleaned in the dissecting room. When sufficient of the anterior surface is exposed, a thick thread is passed through the gland, drawn gently, when by continuing the dissection the operator may get gradually to the back of the gland, removing portions of the mass at a time.

ALCOHOLISM.

(See Alcohol, page 38.)

AMBLYOPIA AND AMAUROSIS.

Amblyopia, or dull vision, and amaurosis, or blindness, usually refer to defective sight or its total loss, the result of functional disturbance of the retina, optic nerve, or visual centres, and unaccompanied by changes in the eye-grounds in the beginning of the disease. These terms, however, include cases of partial or complete blindness, in which optic atrophy subsequently develops, and are often used to describe ocular disorders not limited by the definitions here employed.

These cases may be gathered into certain groups:

I. Congenital amblyopias and amblyopias from non-use of the eyes.

In the former there is often a high degree of error of refraction, usually far-sightedness; the latter is seen when an eye is debarred from binocular vision by a squint. In both the treatment consists in as perfect a correction of the optical error as possible, and, in case one eye alone is involved, the separate exercise of its functions. Congenital amblyopias may include incurable defects in the structure of an eye.

II. Amblyopias, the result of (*a*) general diseases or conditions—typhoid fever, the exanthemata, syphilis, scurvy, malaria, colds, etc; (*b*) local diseases or conditions—hæmorrhoids, hæmorrhage, pregnancy, disordered menstruation, kidney disease, diabetes, migraine, disorders of the nervous system, etc.

The remedies indicated by the special cause are to be employed; the medicinal agents most usually needed being mercury, iodide of potassium, pilocarpine, particularly in uræmic amaurosis, emmenagogues, and tonics, especially hypodermics of strychnine. As local measures repeated fly-blisters to the temples, wet and dry cups, and the constant electric current are used. The nape of the neck may be cauterized or a seton introduced. In hysterical cases metallotherapy may be tried.

III. Amblyopias, the result of the action of certain medicinal and toxic agents.

The abuse of alcohol, and particularly of tobacco, produces a form of amblyopia characterized by the development of a scotoma or an area in the centre of the field of vision, in which the appreciation of red and green is lost or greatly diminished. Quinine in excess has, in a number of instances, been followed by temporary blindness, which is usually denominated quinine amaurosis. Of less frequent occurrence are the cases of amblyopia produced by the toxic action of salicylic acid, lead, silver, mercury, osmic acid, nitro-benzol, and the vapor of sulphide of carbon. In all instances the patient must be withdrawn from the influence of the poison; in tobacco amblyopia, in its early stages, this is usually sufficient to effect a cure. The remedies which have proven of the greatest utility are digitalis, inhalations of nitrite of amyl, nitro-glycerin, and strychnine. Iodide of potassium should be exhibited in chronic cases, and always in amblyopias, the result of lead-poisoning. The constant current has also been employed.

IV., Amblyopias the result of direct or indirect injury, or from reflex irritations.

Traumatic amblyopias may follow a blow upon the eye itself, or an injury to the skull or spinal cord. To carious teeth, intestinal irritations, the presence of parasites and the like a certain number of amblyopias have been attributed, and while it is not possible to disprove the association, such cases must be received with doubt. After the removal of the cause, strychnine should be exhibited.

Optic neuritis most frequently depends upon coarse diseases of the brain (tumor, abscess) or inflammation of its membranes (meningitis). It is also a symptom of numerous disorders—suppression of the menses, exposure to the cold, rheumatism (usually monolateral), anæmia, syphilis, uræmia, lead-poisoning, etc. The remedies are those naturally suggested by the disease or condition which has called it into existence. The prognosis depends upon the cause. Mercury, iodide and bromide of potassium, the salicylates, pilocarpine, local blood-letting, and fly blisters, are the remedies commonly employed. Optic atrophy is either primary, or secondary to disease of the brain or spinal cord, or consecutive to an antecedent neuritis. After all irritation has subsided the greatest improvement may be expected from hypodermic injections of strychnine which should be pushed to the point of tolerance. Temporary improvement follows the inhalation of nitrite of amyl, and in the hope of improving the circulation in the optic nerve digitalis and similar cardiac tonics may be employed.

AMENORRHŒA.

This condition depends upon so many causes for its existence that it must be treated in many different ways. If anæmia or chlorosis show that a deficient supply of blood is present, measures adapted to relieve such states are needed (see Anæmia), while if plethora is a cause depletants in the shape of saline purges are needed, but *aloes are harmful.* Correspondingly, in amenorrhœa due to constipation salines and other purges may be used, but the best of these is aloes, and as constipation and anæmia often exist hand in hand a combination of aloes and iron in a pill is commonly resorted to. The iron improves the blood, and the aloes stimulates and congests the pelvic viscera by bringing blood to the sexual organs. The following pill is often of service and is especially recommended by Goodell:

℞.—Extract. aloes aqueosi	ʒj.
Ferri sulphat. exsiccat.	ʒij.
Asafœtidæ	ʒiv.

M —Ft. in pil. No. 100 and give from 1 to 3 pills three times a day.

Cimicifuga has been highly recommended in chronic and apparently causeless amenorrhœa, in the dose of 30 drops of the fluid extract at the time for a proper flow to occur. Within the last few years the binoxide of manganese in the dose of 1 to 3 grains has come forward as a prominent remedy in simple idiopathic amenorrhœa and is undoubtedly of service, but should be taken for at least two weeks before the date for each menstruation to occur. Potassium permanganate is also useful at the same time in similar states but it is inferior to the binoxide of manganese according to the author's experience.

Apiol, the active principle of parsley, may be given in capsules in 3 to 10 grains for the same condition, and oil of rue, savine, and tansy have also been employed in capsule in the dose of 5 drops t. d.

In all forms of amenorrhœa a hot sitz-bath at the time for the expected "period" is of service, more particularly if the patient has "caught cold." The bath should be persevered in for several nights and care should be taken to avoid exposure. Often a little mustard added to the water will increase the efficacy of this treatment.

Under the name of the Dewees's emmenagogue mixture, first devised by Professor Dewees, of the University of Pennsylvania, the following formula has been largely used in functional and organic amenorrhœa:

℞.—Tinct. ferri. chlor.	fʒiij.
Tinct. cantharidis	fʒj.
Tinct. guaiac. ammon.	f℥iss.
Tinct. aloes	f℥ss.
Syrupi q. s. ad.	f℥vj.

M.—S. Tablespoonful three times a day.

ANÆMIA.

The theory of Bunge that sulphur in excess in the body prevents the assimilation of iron, and its indorsement by Clark is not generally received as correct, for they claim that in chlorosis sulphides are formed in excess, and that this causes chlorosis by non-assimilation of iron, so that the question at once arises, How did the chlorosis come on in the first place, before the sulphides were formed? Sulphides may aid in its continuance, but it is not proved that they produce it, and it is proved that they are often present in enormous quantities where no chlorosis occurs. Again, we have no proof that the manufacture of hæmoglobin depends upon the absorption of iron alone. Clark thinks that when we give iron to such a case the sulphides unite with it and the iron in the food escapes into the blood-making organs. Either the doses of iron must be very accurately fitted to the amount of sulphides, or excessive amounts must be used, so that no sulphide may be companionless. As all persons have sulphides present in sufficient amount to make a characteristic stool on taking iron, we should, according to this theory all have anæmia unless we protected the iron in our food by a constant use of the free metal.

Practical experience does not support the use of enormous doses of iron in anæmia and chlorosis, but rather the contrary. The celebrated teachers of the Dublin school years ago put forward the theory that small doses of iron were more useful than large ones in direct ratio to the severity of the disease, and the writer decidedly agrees with them. There is quite as much likelihood of failure of assimilation of iron by diseased organs as of its destruction by wolf-like sulphides.

We learn from practical experience several things which science does not tell us, namely: Iron will not cure all cases of chlorosis or anæmia, even if they belong to a functional type, but other methods must be resorted to at the same time, or separately, for their cure. The insoluble salts of iron are better remedies for absorption than the soluble salts, because they are not precipitated in the stomach, and for this reason reduced iron is the best chalybeate for uncomplicated cases. Besides using iron in this form, we should employ laxatives if the bowels are confined, mineral acids, particularly nitric and nitro-muriatic, for their effect on the function of the small intestine and liver, and, in addition, bitter tonics of a more or less simple form according to the exigencies of the case; using quinine if malaria seems lurking in the body, simple bitters if the stomach lacks tone, aromatic bitters if, from atony of the muscular coats, the digestive tract seems sluggish, with a resulting formation and accumulation of flatus and digestive juices.

The preparations of iron best employed in anæmia are the insoluble salts just named, such as Quevennes's iron and the carbonate, but there are indications which must be regarded as to the salt to be used. In many anæmic persons, particularly females, the tongue is broad and white, not from coating but pallor, is flabby and torpid looking. Under these circumstances the bowels should be kept moving by mild purges, and the sulphate or some other astringent preparation of iron taken by the patient. In the anæmia of rapid childbearing and lactation, cod-liver oil, the hypophosphites and phosphate of lime should be used with the iron and quinine in tonic dose may be of service in all forms of the disease. With some practitioners Blaud's pill is very much used and is made as follows:

℞.—Ferri. sulph. exsiccat. }
Potas. carbonatis, } . . . . āā ʒij.
Syrupi . . . . q. s.

M.—Ft. in pil. No. xlviii. S. One to three pills three times a day, after meals.

Although it is perfectly true that we have almost no knowledge of the manner in which alteratives act in instances of disease, where through morbid functional activity enlarged glands or growths appear, it is evident that they must act upon the trophic nerves or directly upon the nourishment of the affected parts. If they are used in large quantities they act as depressants to the normal nutrition of the body, producing primarily a decrease in the vitality of morbid growths, so that they melt down and disappear, and they may finally so reduce the condition of the healthy tissues as to cause sloughs and ulcerations. Whether these changes are due to overstimulation of nutrition—that is, to an excessive trophic change—or whether they depend upon actual lowering of the tone of the parts, we know not. One thing we do know, however, and that is, that mall doses of most of the so-called alterative drugs act as very istinct stimulants to the development of normal structures, and in o instance do we find this more typically represented than the effect which they exert upon the blood. Quite a number of years ago Keyes, of New York, emphasized the value of minute doses of merury bichloride in syphilitic and other anæmias, and abundant clinial observation has certainly confirmed his views. The dose of ichloride of mercury in anæmia should be about $\frac{1}{40}$ of a grain. Not nly will minute doses of the bichloride of mercury act in this way, ut small amounts of calomel or mercury itself will have such an ffect.

Inunctions of very small amounts of mercurial ointment once a day, r every other day, in adults and children, will increase the fulness nd redness of the cheeks and lips, and the number of the corpuscles; the piece of ointment used being no larger than the half a very small pea. This treatment will be found of service in cases not dependent upon specific taint or scrofula. The marked increase in the nutrition of children of a syphilitic taint who are suffering from marasmus, under the use of gray powder and inunctions, gives further evidence of this fact.

Arsenic also is of value in anæmic conditions, and may be employed in comparatively larger doses than mercury, but, nevertheless, smaller amounts than are usually given in chorea and similar states. Osler has shown the value of the drug in anæmia, and so has Barton of University College, in England. Any one of the preparations may be employed, but not more than $\frac{1}{16}$ grain of arsenious acid should be taken in a day, although more has been used with no less benefit to the patient. Most of the drug, under these circumstances, is in excess, and is cast off in the urine and fæces unused and wasted, and strains and irritates the emunctories of the body during its passage through them.

Bullocks' blood, fresh, or dried and redissolved, may be used in anæmia by the rectum in those cases where iron fails, and a change of air and diet may often produce a cure which no drug can bring about.

Diet is an important part of the treatment of anæmia. The food should be good, well flavored, and varied, as well as easy of digestion.

It should contain, as far as possible, the remedies needed by the system, such as bone salts, iron, and alkalies, and should be accompanied by some red wine, such as port.

At present we may conclude that pathology has not found out the real cause of these troublesome cases, and that until physiology can put its finger upon the most intricate mechanism of blood-making with a positive, clear statement of its function and the physiological chemistry of the manufacture of hæmoglobin, we must remain satisfied to resort to the remedies which experience or common sense tells us will be of value to our patients.

ANAL FISSURE.

This is one of the most painful affections to which man is susceptible and requires intelligent treatment, generally by surgical means if the result is to be curative, but nevertheless great relief can be obtained by the use of drugs.

The most painful and annoying feature of the lesion is the violence of the pain on defecation, which is so severe that any emptying of the bowel is impossible except on rare occasions, when the pain is concentrated in one effort.

To relieve this pain and enable the patient to have a fairly comfortable stool, nothing is so good as an iodoform suppository containing 2 to 5 grains of the drug. Iodoform being a local anæsthetic the passage takes place almost without the patient's knowledge. If much spasm of the sphincter is present extract of belladonna, ¼ grain, may be added to each suppository. For the cure of the fissure a drop of strong carbolic acid may be applied to the spot and a lotion of tannic acid, glycerin, and water used if hæmorrhoids are also present. Ringer highly recommends the application to the fissure, by means of a brush, of a solution of bromide of potassium, 1½ drachms to 1 ounce of glycerin. In order that the passages may be soft and yet the patient not be purged, sulphur should be given in the dose of one teaspoonful every night, or, if this cannot be used, castor-oil may be given.

The best way to give the sulphur is by combining it with powdered cinnamon or aromatic powder. Sometimes relief is obtained by the use of flexile collodion painted over the part.

ANEURISM.

The treatment of aneurism by drugs is unfortunately not very successful but is at least worthy of trial in all cases. Vascular disease resulting in such a lesion depends upon so many causes which may modify the treatment that the history of the case should be well borne in mind. The most common causes are syphilis, rheumatic taint, and traumatism, and very often injury is superimposed upon one of the systemic taints named. Whatever the cause of the disease may be iodide of potassium is *par excellence* the remedy most apt to do good, and it will nearly always give relief even if it does not cure.

The doses should be large, 10 to 20 grains three times a day, if the patient will bear them, and the prognosis under this treatment is far more favorable if the cause be syphilis than if the disease be idiopathic or traumatic. For its successful use the recumbent position must be insisted upon and the patient kept quietly in bed, changing his position as little as possible and confining himself to the most simple and easily digested diet with entire avoidance of all stimulating substances, either in the way of food or drink. If the heart be excitable and irregular and the vascular system irritable with a high arterial tension, the circulation must be quieted by small doses of veratrum viride, say 1 or 2 drops twice or thrice a day, but digitalis is not to be employed since it increases the strain upon the aneurismal sac, although it does quiet the irregular heart-beat. Aconite may also be used with care, but is inferior to veratrum viride. If the pain be very great, and it often is severe, particularly at night, opium is indicated and sleeplessness should be allayed, not by full doses of morphine, but of morphine and chloral; or, better still, croton-chloral mixed so that the patient receives $\frac{1}{8}$ grain of morphine and 10 grains of croton-chloral in pill at bed-time. All other attempts to cure aneurism by the use of other drugs, unless syphilis indicates mercury, are useless when the lesion is thoracic or abdominal, and where it occurs in the extremities, as in popliteal aneurism, surgical measures are to be resorted to as the chief means of cure. If dyspnœa in thoracic aneurism is marked slight inhalations or "whiffs" of chloroform are useful.

As we do not know how alteratives act, other than that they govern nutrition, we cannot explain the value of iodides in aneurism.

ANGINA PECTORIS.

As the condition which exists in angina pectoris, so far as pathology and morbid anatomy are concerned, is unknown, it is impossible for us to establish any scientific basis for the employment of drugs in the cure of this disease. The nearest approach to any such attempt is that first proposed by Lauder Brunton and is but another evidence of the value of studies upon animals, since he argued that as he found nearly all attacks of angina pectoris were associated with vascular spasm, that vascular spasm might be the cause of the paroxysm, and that a drug decreasing this spasm would be of service in consequence. Whether the vaso-motor excitement is "cause or effect" we do not know, but we do know that drugs which decrease arterial pressure often give relief in the attack if it be associated with high pressure, and even may eventually produce a cure. Further than this, we know that nitrite of amyl, nitrite of sodium or potassium, and nitroglycerin, are of this class. All of these drugs lower blood pressure at once and powerfully, but the nitrite of amyl and nitroglycerin are the best remedies for the attack itself, and the nitrite of potassium or sodium for the intervening periods, or where the paroxysm is prolonged. The reason of this lies in the fact that the sodium and potasssium salts are more stable than the other two compounds, are more slowly broken up in the body and, therefore, more prolonged in their effects. In an attack a few drops of the nitrite should be given by inhalation from a handkerchief or the nitroglycerin can be used in the dose of 1 drop of a 1 per cent. solution by the mouth. The dose of the sodium and potassium nitrites is 3 grains three times a day but all these drugs are useless unless the arterial tension is high and the heart throbbing or irregular in its exercise of power. If vascular relaxation is present they should be supplanted by stimulants, such as alcohol, in full dose, in warm water.

Digitalis may be given during the attack to stimulate the heart, if it is weak, and between the attacks to improve its condition. The writer has found 20 grain doses of antipyrine of great service in some cases. Ether given hypodermically is often of service, but Hoffmann's Anodyne may be used instead of ether when it is administered by the mouth.

If the nitrite does not relieve the pain, or if it cannot be used, morphine must be given hypodermically in the dose of ¼ to ½ grain but it should never be given by the mouth, as its absorption will be too slow and its effects will come on after the pain has ceased.

In the form occurring in nervous females, 1 drachm of ether in water or capsule will often abort the attack, or if the paroxysm be caused by dyspepsia, and if the stomach be overloaded the sufferer may be relieved by the stomach-pump. The cure of the patient rests upon the elimination of all causes which can possibly produce a nerve storm of cardiac irritability and in the administration of arsenic in full dose for long periods of time. Phosphorus is another remedy which is of undoubted value and should always be tried in the dose of $\frac{1}{100}$ grain three times a day after meals.

The diet should be moderate and easy of digestion and salads, lobster and similar things abandoned. If the patient is inclined to take exercise of a violent character he must be quieted, but some exercise must be insisted on if it is possible.

Tonics, fresh air, freedom from mental worry and avoidance of cold are also necessary.

Cocaine has been highly recommended for the cure of angina pectoris, but is as yet untried, except in a few cases.

ANOREXIA.

Anorexia is only a symptom of disease, generally associated with debility or other systemic cause, such as fever or many other exhausting diseases.

It is best treated by a careful diet, the use of the bitter tonics, such as gentian, cardamoms, and the mineral acids, or by the use of one of the following prescriptions :

℞.—Acid. arseniosi	gr. ½.
Ext. nuc. vom.	gr. iv.
Quin. sulph.	gr. xx.

M.—Ft. in pil. No. xx. S. One t. d. after meals.

Or

℞.—Tinct. cinchonæ comp.	f℥vj.
Acid. muriat. dil.	f℥ss.

M.—S. Dessertspoonful three times a day, after meals, well diluted with water.

For the use of other bitter tonics see Columbo, Quassia, Chamomile, Cardamoms, and Strychnine.

None of these drugs are suitable if there is any acute irritation or inflammation of the stomach or intestines. (See Indigestion.)

APHTHOUS STOMATITIS.

This annoying affection is most commonly seen in children, and is characterized by the appearance on the tip and sides of the tongue, lips, and lining membrane of the mouth of small white spots which sometimes have a reddened zone around them. They often extend through the alimentary canal and produce much systemic disturbance.

The best treatment, if the kidneys are not acutely inflamed, is the use of the following prescription, which largely depends for its value upon the potassium salt used.

℞.—Potas. chlorat.	ʒj.
Tinct. myrrh.	gtt xx.
Elixir calisayæ	f℥iij.

M.—S. Teaspoonful in water every 4 hours.

As the chlorate of potassium is eliminated by the saliva, it not only does good when taken into the mouth, but is active all the time that it is being eliminated. The same preparation may be used as a mouth-wash if the stomach is disordered. Often constipation will exist and it should be removed by salines or by rhubarb in the form of the aromatic syrup. Another remedy which is very efficient in stomatitis is borax, used as a mouth-wash, in the strength of 10 to 15 grains to 1 ounce of water and honey, as follows:

℞.—Sodii boratis	gr. xxx.
Mel. purificati	f ʒ iij.
Aq. . . . . q. s.	f ℥ iij.

M.—S. To be used on a swab or as a mouth-wash every four hours.

This may also be used internally in adults.

If the liver is at fault and is torpid nitro-muriatic acid is useful, and when the spots do not readily yield to treatment they may be touched with the tip of a stick of silver nitrate, which, while it is momentarily painful, is very efficacious.

Nearly always with this disease in childhood there is considerable fever, vomiting, and wakefulness at night, with fretfulness and crying during the day, and total refusal of food, not because hunger is absent, but because the food hurts the mouth and is rejected with a cry of pain as soon as it touches the lips. The food should be very soft, milk toast for older children, or milk with lime-water in it in large amount for infants fed by the bottle. A warm foot-bath at night is often necessary to produce rest, and 10 drops of sweet spirit of nitre thoroughly diluted may be given with advantage to a child of one or two years. If the irritability of the nervous system is excessive, bromide of sodium or potassium in the dose of from 1 to 10 grains, according to age, three times a day, is of service, and may be added to the mixtures already named; or better still, given alone.

After the attack is past tonics and a carefully selected diet are generally necessary.

APOPLEXY.

When a person suffers from a stroke of apoplexy the chief aim of the physician must be to lower the blood pressure, and so to decrease hæmorrhage, and as the blood pressure is nearly always excessive under these circumstances its reduction may be considered as a routine treatment. If the person be at all full-blooded copious venesection is to be employed, any one of the veins in the arm on its anterior surface being most convenient. (See Venesection.) At least one pint should be withdrawn and the condition of the pulse carefully noted. If bleeding is impossible veratrum viride or aconite must be used to lower blood pressure, the latter in full dose, 5 drops of the tincture. Hot mustard plasters must be applied to the feet or a warm mustard foot-bath be used, if this practicable. Ice in an ice-bag or wrapped in a towel may be applied to the head, and if vomiting comes on care must be taken that the stertorous breathing does not draw particles of the food vomited into the lungs. Sometimes croton oil, 1 drop, placed on the tongue may cause a depletant catharsis, or $\frac{1}{6}$ grain of elaterium may be used. The head must be kept high and the feet low down. These are the methods to be used immediately after the rupture of the bloodvessel in the attack. The object to be sought, after the "stroke" has occurred and the hæmorrhage has ceased, is the removal of the extravasated blood, the restoration of function in the paralyzed parts, and the prevention of secondary lesions consequent upon inflammation of the brain as a result of the injury to its substance. If the patient survives the attack no drugs should be used, save arterial sedatives, for one or two days, until the clot in the ruptured vessel has become firmly fixed, unless symptoms of meningitis arise, when these drugs must be pushed and opium and calomel administered in small antiphlogistic doses, $\frac{1}{4}$ grain of each every four hours. Meningitis and cerebritis rarely occur if the veratrum viride or aconite is properly used. After the clot is firmly formed and has plugged the bloodvessel we may proceed to take measures for its absorption, the chief of which consists in the use of iodide of potassium in as large doses as the patient will bear without the production of iodism. This drug should not be resorted to until several days, or even two or three weeks have elapsed.

Mercury in small doses may also be given.

In order that the muscles of the extremities may not waste and become useless from disuse, passive exercise, rubbing, and, if possible, massage must be resorted to. Electricity may be applied to them in the form of the slowly interrupted current and strychnine may be used hypodermically, or by the mouth, as a stimulant to the trophic centres in the spinal cord. None of these measures are to be employed if any inflammation exists in the brain, as they will increase the cerebral disorder, and at least three weeks should elapse after the attack before they are resorted to.

Electricity applied to the head to relieve the lesion is useless, as the current does not go through the brain, but around the skull by means of the scalp.

A very careful diet is to be maintained. Meats are to be used very sparingly, the bowels maintained in perfect regularity, and no wines are to be taken nor any stimulants used, lest they cause a second rupture of the weakened vessel in the brain.

Apoplexy must be carefully differentiated from acute alcoholism and opium poisoning, which it much resembles. (See Alcohol.)

If respiration fails, nothing can be done with much advantage, but belladonna or strychnine may be given hypodermically. The use of electricity to stimulate the diaphragm to contraction is a remnant of senseless medical practice and particularly useless in apoplexy. (See Asphyxia.)

Above all things stimulants are contra-indicated, even though the pulse fails, as they increase the hæmorrhage into the brain.

ASPHYXIA.

With the advent of the production of artificial anæsthesia by the use of certain chemical compounds the importance of this subject necessarily became enormously increased, and no one can doubt that the majority of cases of arrested respiration depend for their exciting cause upon some such agency, or to the inhalation of noxious gases. It is of the greatest importance that a clear idea of the necessities of the case be before the physician under such circumstances, and that his action be one of rapidity and clearness so far as the ultimate result which he seeks is concerned. By some curious fallacy of teaching the greater part of the profession have been taught to faradize the diaphragm into contraction with the rapidly interrupted electrical current, by the application of one pole over the phrenic nerve in the neck and the other over the abdomen. It requires but little thought to show that such a method is ludicrous in the extreme, for by using such a current on any muscle, we produce a condition of spasmodic contraction or tetanus. Everyone knows that the diaphragm relaxed by paralysis or contracted by spasm, so long as it is immovable, is equally harmful to the patient. If any current is to be employed, let it be that which is slowly interrupted and which will alternately contract and relax this important respiratory muscle. There can be little doubt that the rapidly interrupted current has caused persons to renew their respiratory movements, but in these cases the result has been dependent almost certainly on the reflex excitability of the cells in the spinal cord and medulla rather than on an action upon the phrenic nerve. If such an action is required, the poles of the battery may be swept over the body so as to cause peripheral irritation.

The absurdity of the application of the rapidly interrupted current to the phrenic nerve is not alone dependent upon the points we have named. It has been proved by careful observation on the part of Dr. Martin and the author that the application of the electrode over the phrenic nerve in the neck may cause cardiac arrest through diffusion of the current to the vagus nerve, and Griswold reached conclusions of an identical character in the year 1885.

If electricity is used, it should be employed solely as a peripheral irritant, with the object of arousing the patient, as would a dash of cold water,

The question at once arises as to the best thing to do when such an accident occurs. If the arrest has occurred when the patient is under chloroform, his head should be lowered and the feet raised almost perpendicularly. The neck should not be extended but held in the normal position, so that the chin is somewhat shot forward and at a right angle to the body line. If the neck be extended the glottis does not open as well when the position named is assumed. While one assistant supports the head, another should use artificial respiration by Sylvester's method, and it will then be readily seen that there is an increased volume of air passing in and out of the chest. The drawing forward of the tongue is not so important as is imagined, unless it is turned with its tip toward the glottis. The use of ammonia as a rapidly acting respiratory and cardiac stimulant, when given intravenously into the leg, may be resorted to, and dashes of cold and hot water should be employed, not only for their excitation of the peripheral nerves, but also for the purpose of keeping the bodily temperature from rising above or falling below the normal line, the latter danger being the most pressing, of course. The hypodermic injection of ether during asphyxia from ether anæsthesia is a ridiculous therapeutic attempt, for if the system and respiratory centres are so depressed by the ether already taken into the blood through the lungs as to have their functions in abeyance, why should we add still greater depression by injecting more of the same drug? Let everything that is done be born of sense and thoughtfulness of the exact action and result desired, and let nothing be done simply because some other person has done it, great though he may be in the practice of the healing art. Measures for the relief of persons suffering from any malady depend not upon empirical laws, but upon the good common-sense of the physician in charge, even if the measure is a most revolutionary one in character.

When practising artificial respiration in cases of asphyxia, Sylvester's method should always be employed. This consists of laying the patient on some hard, flat surface, kneeling above his head, and then, after grasping the arms at the elbows, to bring them upward and outward, so that they follow the plane on which the body is extended. This movement cause expansion of the chest or *inspiration*. After a moment's pause the arms are lifted up and brought toward one another, and then, while still approximated, pushed down to their original position upon the floating ribs upon which they are pressed. This last movement drives out the air from the chest, or causes *expiration*. These movements should be at the rate of from sixteen to twenty per minute, about normal respiration, and be persisted in for at least forty-five minutes if necessary. While they are being carried on the patulousness of the upper air-passages is to be maintained. In some researches made by Dr. Martin and the writer, the following rules regarding the position of the head, neck, epiglottis, and tongue were formulated :

The fingers are passed behind the angles of the lower jaw, and the latter is pressed forward ; this elevates the epiglottis and the base of the tongue about a quarter of an inch from the post-pharyngeal wall. Extending the head and pushing it forward so that the neck makes an angle of forty-five degrees with the plane of the table, draws the base of the tongue and the hyoid bone far forward, this motion being at the same time imparted to the epiglottis, so that the latter stands upright and is separated from the posterior wall of the pharynx by an interval of about an inch. By tightly closing the jaw the antero-posterior space is still further increased.

The epiglottis may prevent free entrance of air to the lungs even though the tongue is pulled forward. Any means which accomplishes the anterior projection of the hyoid bone immediately and infallibly raises the epiglottis and the base of the tongue, and the hyoid bone may be made to project anteriorly by direct pressure upon its cornua, by direct pressure or traction applied to the tongue far back behind the anterior half arches of the palate and by the action of gravity in the abdominal decubitus, or by extension of the head upon the neck, but flexion of the neck with extension of the head upon the neck does away with the epiglottis as an obstructing factor as completely as any other posture.

ASTHMA.

Asthma is one of the most difficult diseases to treat successfully that the physician has to deal with.

The disease in all its forms depends upon interference with the free entrance and exit of the air in the lungs, and this is generally if not always dependent upon a spasm of the muscular fibres in the walls of the bronchial tubes, although it has been asserted to be due to a sudden swelling or hyperæmia of the bronchial mucous membrane. Both of these states are probably present in varying degree in all cases.

The spasm has been proved by Longet, Williams, Romberg, and, more important than all, by Paul Bert and Bierner to be due to a neurosis of the pneumogastric or vagus nerve, while the swelling of the mucous membrane has been seen by Stoerk and others. This has formed two schools of teaching concerning the pathology of this disease when a little attention to the physiology of the subject would at least show that no difference need exist, the vagus nerves governing not only the muscular fibres but also the bloodvessels of the bronchial tubes. The discovery of Michaelson that injury of the recurrent laryngeal nerves causes catarrhal inflammation of the bronchial tubes, particularly of the upper lobes, renders the analogy between acute asthma and laryngeal spasm which has been spoken of by many writers still more interesting.

One other step remains for a thorough understanding of the manner in which the disease is produced. Gastric, dyspeptic, or intestinal asthma arises from indigestion, as its name implies, and is caused by the irritation of the afferent filament of the vagus in the walls of the stomach and intestine, thereby causing reflexly a contraction and hyperæmia of the bronchial tubes.

Having now obtained some idea of the cause of an attack, let us turn to the treatment of the affection.

By far the most serviceable remedy in asthma as every one knows, is belladonna which, as has been pointed out when that drug was studied (see Belladonna), exercises in medicinal dose a decided sedative and depressing influence on the peripheral filaments of the vagus nerves not only so far as the heart is concerned, but also upon bronchial secretion, which is always diminished by the drug, probably by its vagal influence.

It is evident therefore that the use of belladonna or atropine although originally employed in an empirical manner, is really based upon rational ideas, and as the physiological action of stramonium, hyoscyamus, and similar members of this group is identical with belladonna, their influence for good is also explained. The experiments of Ott proved that lobelia is a peripheral pneumogastric depressant, and those of Rosenthal and the author likewise found that tobacco has a similar effect. The same is also true of nitrite of amyl and the other nitrites which also relax unstriped muscular fibre. We have before us, therefore, a list of the most efficacious and best antiasthmatics, all of them being depressant to the peripheral vagi.

The other remedies commonly employed are chloroform by inhalation, which relaxes the spasm of muscular fibre by its local influence, and morphine which acts as a nervous sedative, prevents reflex irritation and quiets the patient, acting at the same time as a heart stimulant and unloading the engorged cardiac cavities. The relief obtained by the inhalation of the fumes of nitrate of potassium, Sée asserts, depends upon the formation of the protoxide of nitrogen and carbonic acid gas, which act as local anæsthetics.

The practical treatment of an attack of asthma consists in the use of morphine hypodermically in the dose of $\frac{1}{6}$ to $\frac{1}{4}$ grain alone, or in combination with atropine. Cigarettes made of paper soaked in a solution of nitrate of potassium and belladonna may be used, (see formula, Belladonna), or they may be made in the following manner :

℞.—Fol. belladonnæ	gr.vj.
Fol. hyoscyami	gr.iij.
Fol. stramonii	gr.iij.
Ex. opii	gr.$\frac{1}{4}$.
Aq. lauro cerasi	q. s

These various leaves are broken up like commercial tobacco, and moistened by adding the cherry laurel water which should contain the opium. Finally a whole leaf soaked in the same fluid is used as a cover, or a piece of cigarette paper may be employed in the same manner.

The use of amyl nitrite by inhalation, 3 to 6 drops on a handkerchief, is invaluable in most cases, and it never fails to relieve the spasm. Owing to the engorgment of the heart consequent upon the embarrassment of respiration, it must be used with care, and in one or two instances has proved dangerous.

Sometimes tobacco may be smoked, and is particularly efficacious in those who are not accustomed to its constant use.

Lobelia when employed should be used in full emetic dose (1 drachm) in the form of the tincture if an attack is present. If an attack is feared 10 drops of the tincture every four hours may be given if the heart is in good condition.

The curative treatment of asthma rests upon the use of iodide of potassium to a very large extent, and in the careful regulation of the diet and bowels, particularly if the trouble seems to be dependent upon indigestion. As the attacks are generally nocturnal the evening meal should be taken early, be light and easily digested, and tea and coffee be avoided at this time. The patient should avoid dusty streets and live in the open air as much as possible, and a damp atmosphere is usually preferable to a dry one, provided it is not too cold. This rule is subject to many variations, and each case will be found a law unto itself, and must try different climates until the proper one is found. Arsenic may be used, particularly if the mucous membranes are below par, and a dose of bromide of potassium or sodium, 30 grains, half an hour before retiring to bed, may be of service. Grindelia robusta is largely used as a prophylactic in the dose of 10 to 30 minims of the fluid extract three times a day.

Lobelia may also be used in the form of the tincture, 10 drops three times daily.

Compressed and rarefied air are of service and inhalations of oxygen are valuable if the cyanosis is extreme.

In some cases the presence of nasal polypi or other irritations of the air-passages causes the disease to appear and must be removed before a cure can be attained. In other instances arsenical wall papers are at fault.

BED-SORES.

Bed-sores depend upon disturbances of nutrition resulting from pressure exercised in such a manner that the local circulation is interfered with at a time when the vitality of all the tissues is depressed by disease or injury. In most instances the part involved becomes chafed by creases in the sheets, by crumbs of food, or by moisture from the discharges of the rectum and bladder.

The chief thing to be done is to prevent the trouble by careful nursing and cleanliness, which must be supplemented by measures devoted to the hardening and improving of the skin covering the parts where the sores are apt to appear, as over the buttocks and sacrum. To permit of a good supply of blood the patient should be turned on one side or the other every few hours and the skin rubbed thoroughly with a dry towel to cause a healthy transudation and absorption of the nutritive juices. Salt and whiskey, 2 drachms to the pint, may be rubbed over the skin, or tincture of catechu and the dilute solution of the subacetate of lead applied to harden it. If this is not used, a mixture of alum and spirit of camphor is useful, made by adding 1 ounce of powdered alum to the whites of 4 eggs and mixing this with 2 ounces of the camphorated spirit. Where the skin is very red and angry looking, but still intact, a solution of nitrate of silver of the strength of 20 grains to 1 ounce is to be thoroughly painted over the spot. All these remedies act in hardening the skin through their astringency, or by acting as sedative astringents to the inflamed capillaries of the part.

When a bed-sore is developed measures must be taken for its cure and the prevention of its spread. With this object in view the body must not rest on the part affected if it can possibly be avoided, and in order that the sore may be protected and the pressure equalized, a large piece of soap plaster with its edges deeply incised to make them pliable, should be applied after the sore has been thoroughly washed out by means of a swab or syringe with a 1 to 5000 solution of bichloride of mercury and dusted with iodoform. Sometimes large squares of lint heavily covered with zinc ointment are serviceable in lieu of the soap plaster. If the sores spread and burrow through the parts the sinuses should be freely opened and irrigated, all dead tissues being cut away to avoid sepsis.

Nitrate of silver in the strength of 20 grains to 1 ounce may also be used as the patient recovers, if the ulcers seem sluggish and a *smooth* slip-sheet should always be placed under the buttocks. If possible, supportive measures and an increased amount of food should be given if the sloughs are large.

BILIOUSNESS.

This is a term used to designate a state which presents different symptoms in different cases, but always includes languor, headache or dizziness, perhaps some yellowing of the skin and conjunctiva, and a general sense of atony, mental depression, and discomfort. It depends not upon an excessive secretion of bile, but upon some perversion of its function or secretion, or its retention in the bile-ducts. Further than this, most of the symptoms do not depend directly upon the changes in the bile, but upon failure of proper digestion in the stomach and intestine, coupled with the development of irritative decomposition-products of various kinds. The stomach, intestine, liver, pancreas, and their juices all form a complex interwoven chain of function in which if one link breaks the entire chain becomes disturbed. The entrance into the stomach of certain foodstuffs, which are either ill-prepared or improper for gastric digestion, rapidly causes the development of active fermentation and a splitting up of these bodies, with the formation of lactic and butyric acids, which irritate the gastric mucous membrane and thereby bring about a faulty gastric secretion of mucus, which aids in making still further trouble. By the same means the circulation of the stomach is disturbed and becomes abnormal, and the intestine, liver, and pancreas receive reflex irritation to which they are not normally exposed. Further than this, the irritated stomach fails to convert its contents into peptones and the general features of chyme, and too early drives out into the duodenum a mass of semi-digested and fermenting material, utterly unfit for intestinal digestion and absorption, thereby disordering the functions of these parts still further at a time when they are not prepared for the reception of any food. The secretion poured out by the different glands varies from the normal, the alkaline juices are not able to overcome the normal acid of the gastric juice plus the lactic and butyric acids, and finally the reaction of the intestine becomes acid instead of alkaline with resulting irritation and secretion of morbid juices and mucus. The trouble while existent in the stomach gives rise to headache and discomfort, a bad taste in the mouth, and perhaps pain, and is followed by fever, languor, jaundice, and flatulence when the intestine is affected. The cause of these symptoms rests upon the fact that while gastric juice and bile are antiseptic, pancreatic juice mixed with food undergoes rapid decomposition with the development of products of decomposition such as skatol and indol and a large number of poisonous alkaloids. Normally these are not allowed to form owing to the presence of antiseptic bile, which also hurries on the absorption of the food, but if the bile is retained in its ducts its secretion is impaired and its constitution altered by the disorder of the liver, which results reflexly from the gastric and intestinal irritation. Unfortunately the complication does not cease at this point, for the liver in health has other functions to fulfil, one of the most important of which is the arrest and destruction of all poisons of an organic character which come to it from the stomach and bowel. Not only are decomposition-products destroyed by it, but all the vegetable alkaloids are rendered innocuous if present in ordinary amounts.[1] The disorder of hepatic function, therefore, permits the entrance into the general circulation of these substances, which are very various as regards their powers and effects. Thus Brunton has pointed out that one of these compounds closely resembles curare, in that it poisons the peripheral ends of the motor nerves, and thereby is at least partly responsible for the muscular relaxation and languor often seen in patients suffering from so-called "biliousness." Other substances act as do digitalis, atropine, muscarine, and picrotoxin, and the number of these various compounds is indefinite.[1]

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[1] See studies of Schiff, Lautenbach, and many others, including Ludwig and Schmidt-Mulheim.

It is impossible to give space to a further consideration of these poisons, but what has been said shows clearly that "biliousness" only expresses a state in which absorption of the bile is not the cause alone, but that other poisons are at work. The methods of treating biliousness are therefore not to be considered as depending upon some regular routine, but upon a study of the case and its symptoms.

Very frequently after several days of minor discomfort, the attack culminates in a severe sick headache, after which vomiting comes on and relief is obtained almost at once. Such patients can generally be relieved in the very first part of their discomfort by emetic doses of ipecac or apomorphine, 30 to 60 grains of the former or $\frac{1}{15}$ grain of the latter hypodermically. The manner in which this treatment does good is very evident. It compresses the liver and expels inspissated bile by the compression exercised by the abdominal walls and diaphragm in the effort of vomiting and thoroughly excites to normal secretion the torpid glands of the stomach and intestine.

The vomiting also rids the stomach of the fermenting masses and bacteria contained in them and renders the alimentary canal pure. This purity may be increased by draughts of warm water, or water containing a few grains of bicarbonate of sodium or salicylic acid, between the paroxysms.

When it becomes evident that an attack is about to begin, that is, when constipation, slight drowsiness or languor after meals show the tendencies present, one of two drugs should be used, namely, either podophyllin if the stools be dark, or calomel if they be light colored. One-sixth grain of the former to an adult is generally enough, or 1 grain of calomel divided into six powders, one of which is to be taken every 15 minutes, is a good dose, to be followed in four hours by a saline. If the attack is sudden in its onset no time is allowed for these hepatic stimulants, and a saline should be used in a good sized dose at once, not because it causes a flow of bile but because it sweeps the poisonous matters out of the gut before absorption can occur and aids in restoring the normal intestinal alkalinity.

The prevention of "biliousness" depends upon the maintenance of a normal, easily digested diet, upon the formation and excretion of normal bile, and the prevention of fermentation and decomposition in the alimentary tract.

The term "normal diet" is a very elastic one and varies with each case. While rules generally hold good that certain forms of food are good or bad, easy of digestion or difficult of assimilation, it nevertheless remains a fact that many of the simplest foods are capable of acting as poisons. A large number of persons cannot take milk or eggs because their digestion of these substances is faulty, and the writer is cognizant of one case where lobster salad can be eaten at bed-time without discomfort while an egg at breakfast will cause a severe headache or pain in the belly. Rules as to diet must not be "iron-clad" but based on observation.

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[1] See the researches of Schweringer, Zuelzer and Sonnerscheim, Bence Jones, Dupré, Rörch and Fasbender, Brieger, Schmiedeberg and Harnach.

By far the best means of maintaining hepatic activity in cases where this organ is torpid is horseback exercise, particularly on a trotting horse, as the jolting by its movement of the liver keeps the digestive chain of functions active and prevents the secretions from becoming clogged. Along with this exercise massage of the hypochondrium and belly walls is useful and the movement of stooping over, bending from side to side, and bending backward with the feet close together is of value. Coffee is often the cause of biliousness because of its oil.

The use of pure red undiluted nitro-muriatic acid in these cases in the dose of 3 drops three times a day is invaluable, and the fluid extract of stillingia in the dose of 20 drops is of service, as is also the solid extract of euonymus in the dose of 3 grains. Five-grain doses of chirata are also useful in hepatic atony.

The knowledge of the action of many of the poisonous materials formed renders it possible for us to relieve the patient by other means than those which may be generally resorted to when the attack is present. Thus if the pupils are dilated, the skin hot and dry, the eyesight dim, and the pulse rapid, the alkaloid producing these signs of atropine poisoning may be antagonized by opium in small dose, or if the pulse be slow and full, the arterial tension high, and there is throbbing in the head with frontal headache the alkaloid representing digitalis may be antidoted by the use of aconite. If nervousness and irritation ensue the bromides and chloral may be used.

For some unknown reason the use of caffeine, in the headaches of biliousness, nearly always makes them worse, particularly if the headache is due to over-indulgence in coffee.

If the face is flushed a mustard plaster or cup to the nape of the neck may be used, and a hot foot-bath is often of service.

In cases where the bilious attacks are associated with catarrh of the stomach, intestines, and bile ducts, chloride of ammonium, in 5 grain doses three times a day, is very useful, as is also the protiodide of mercury, when triturated with sugar of milk, in the dose of $\frac{1}{60}$ to $\frac{1}{40}$ of a grain three times a day.

BLEPHARITIS.

Blepharitis is divided clinically into an ulcerative and non-ulcerative variety. The indication of prime importance in the treatment of this affection is the removal of the scars and crusts before the application of the local remedies. This may be accomplished by the use of alkaline solutions, bicarbonate of sodium, or borate of sodium (grains 8 to the ounce) or a 5 per cent. solution of chloral, as recommended by Gradle. The salves which have met with the greatest success are Pagenstecher's ointment (yellow oxide of mercury 1 grain, vaseline 1 drachm), dilute citrine ointment, pyrogallic acid ointment, or a 3 per cent. milk of sulphur ointment, to which resorcin may be added. The latter application is useful in the squamous variety alone. In the ulcerated form, if the crusts are tenacious, these, as well as the stunted cilia, must be removed with forceps, and yellow oxide of mercury salve, or some similar application, applied. Excellent results follow touching the crater-like abscesses, which exist in edges of the lid, with nitrate of silver. If there is an accompanying conjunctivitis a boracic acid lotion is suitable, while, under any circumstances, obstruction of the lachrymal duct, a frequent accompaniment of the disease, must be removed, and the nasal passages explored for any chronic inflammatory condition. The relation between this disease and the presence of refraction errors demands the correction of the latter, should they exist, before a hope for cure may be entertained.

BOILS.

Boils are dependent upon an impoverished state of the system, due to several causes, or more rarely to some local trouble with the skin, as in oil or paraffine workers.

Their constitutional treatment rests upon the use of fresh air, cod-liver oil, iron, arsenic, phosphate of sodium, and, if any boils are present at the time, the use of the sulphide of calcium in the dose of $\frac{1}{10}$ grain every five hours. The sulphide of calcium or, more properly speaking, sulphurate of calcium, hastens the maturation of boils and prevents the formation of new ones, but is useless in the boils of diabetes, according to its original user, Dr. Ringer.

The local treatment of boils may be divided into the abortive and curative method. The abortive method consists in painting the inflamed spot, when it first begins, with a solution of gun-cotton (collodion) and renewing the coat hour after hour until a heavy contractile covering is formed.

If pus forms under this it may be absorbed, if left alone, but if this does not occur then the boil must be opened under antiseptic precautions and properly dressed. A strong solution of nitrate of silver is also very useful at the very beginning of the formation of a boil, painted over the part in the strength of 20 grains to the ounce. The other local applications consist in the use of the extract of opium or belladonna over the part to relieve pain and decrease the inflammation.

Poultices may also be used to relieve the sensation of tenseness and mature the boil, and should contain sweet oil and laudanum. Ringer recommends the employment of alcohol and camphor over the skin in the early stages, which is then wiped dry and camphorated oil smeared over the part, and Stelwagon uses the following:

℞.—Ichthyol . . . . ʒj.
Emplast. plumbi . . . . ʒij.
Emplast. resinæ . . . . ʒj.
M.—S. Apply to the part.

He also approves of the injection of a 5 per cent. solution of carbolic acid into the apex of the boil if its formation is assured.

BREASTS, INFLAMED.

Mastitis is, from a medical point of view, readily treated. Lactation should at once cease and the breast be dressed by the use of a sponge compress, underneath which belladonna ointment is to be copiously smeared. Belladonna is useful both before and after very acute inflammation has set up, and should be persisted in for twenty-four hours.

At the same time that these measures are resorted to, the circulation should be thoroughly impressed by aconite or veratrum viride and the use of mild or saline purges. If the milk persists in forming it must be removed by the breast-pump. For the surgical treatment of mastitis the reader should refer to the books on such subjects.

BRIGHT'S DISEASE, ACUTE.

The treatment of acute nephritis, accompanied by any active inflammatory change, requires care and intelligence. The pain in the loins and, perhaps, the bloody urine, which is scanty and high colored, the febrile disturbance, and the history of exposure or other exciting cause, all form a clinical history typical of its major points. Here, as elsewhere, for the reduction of inflammation, circulatory depressants are to be resorted to, and aconite is generally most serviceable. The patient should be kept quietly in bed and supplied with a milk diet, cups or leeches being used over the loins if the urine is scanty. Blisters are not advisable, as the irritant substances producing them may be absorbed and cause increased renal irritation. The restlessness will generally be quieted by the aconite, but if this fails, resort must be had to bromides, or small doses of opium, which must be given cautiously, as it is not readily eliminated when the kidneys are diseased. Cannabis indica is thought to be of great service if bloody urine is present, but chloral is generally too irritating to the kidney to justify its employment. The appearance of large amounts of blood in the urine is an indication for the use of drop doses of tincture of cantharides, according to Sidney Ringer, given every few hours at about the fifth day.

If dropsy comes on and is excessive it must be relieved by the use of hydragogue purges, such as elaterium, which is particularly useful in that it is supposed to aid in the elimination of the urea by the bowel. Jaborandi or pilocarpine may be used to sweat the patient at this time or in the earlier stages with advantage; $\frac{1}{8}$ grain of the muriate should be given hypodermically and repeated in fifteen minutes if no sweat appears. Hot-air baths are often useful to provoke a sweat. Warm mucilaginous drinks, as flaxseed tea, are of service, and the use of the citrate of potassium and sweet spirits of nitre should be resorted to to increase urinary flow. Generally these cases go on to recovery, which is, however, often somewhat prolonged. The treatment of the later stages consists in the use of stimulants to the kidneys to arouse them from the atony consequent upon the excitement of inflammation. To this end digitalis and squill, or digitalis and calomel may be used in small amounts gradually increased and followed by the compound spirit of juniper or gin as the case progresses. If the renal structure is persistently atonic, $\frac{1}{2}$ to 1 drop of the tincture of cantharides at each dose may be used, and as anæmia is often a prominent symptom, tincture of the chloride of iron, which is both diuretic and a tonic, should be resorted to. If renal hæmorrhage is excessive, gallic acid and ergot are indicated to control the bleeding.

BRIGHT'S DISEASE, CHRONIC.

The treatment of chronic nephritis is a very different matter, so far as prognosis is concerned, from that of the acute form. It is almost, if not quite, impossible to cure the condition present and we can only improve the state of these and other organs by care and proper drugs. As Tyson has aptly put it, we must try to arrest the development of the renal lesions and improve the general health, treat the symptoms which are not dependent upon the nephritis, except indirectly, and last, treat those signs which are due to the nephritis itself. To arrest the disease all alcoholic drinks should be avoided as far as possible and business cares and worries be cast aside. Great care should be taken to avoid cold and a warm climate is generally to be recommended.

The diet and drink are important considerations and should consist largely of milk. Beyond this we can do little toward a *cure*. To allay symptoms we can do much, and the albuminuria can be greatly decreased by the use of digitalis, squill, the acetate and bitartrate of potassium, and the iodides; nor should the bichloride of mercury be forgotten. These remedies are also of value to relieve the dropsy, and the most efficacious of them all is probably a combination of the bitartrate of potassium and juniper berries, so that 1 ounce of the former is dissolved in 1 pint of an infusion of the latter and taken in twenty-four hours. If dropsy ensues hydragogue purges are useful, such as jalap and elaterium, and hot baths, Turkish or Russian, are to be given, not only to relieve the dropsy, but so to hypertrophy the excretory glands of the skin that they will relieve the kidneys.

The ascites or thoracic effusions, which occur, should be tapped and drawn off.

In the interstitial forms of the disease Bartholow has highly recommended the use of the chloride of gold and sodium in the dose of $\frac{1}{10}$ to $\frac{1}{20}$ grain. The anæmia is to be combated by the use of the tincture of the chloride of iron and oxygen inhalations.

The arsenite of sodium and the carbonate or citrate of lithium are also said to be of value in this form of Bright's disease, particularly if it is dependent upon a gouty taint. The dose of the former should be $\frac{1}{20}$ grain, and of the latter 5 grains three times a day.

BRONCHITIS, ACUTE.

In the early stages of bronchitis there is always present a very distinct hyperæmia, followed by a true inflammation of the mucous membrane lining of the bronchial tubes. When these changes are confined to the larger bronchi the term bronchitis is employed, but when the minute bronchioles are invaded the disease is known as capillary bronchitis. Under the head of "pneumonia" and elsewhere, the writer has spoken of the various stages of inflammations, and has described the action of the various drugs and measures here indicated. In many cases the physician only sees the patient when the second stage of his disease is present, but if the individual presents himself at once the following history and physical signs will indicate the treatment to be employed. After exposure, more or less severe, to wet, dampness, or dry cold, a sensation of oppression comes on, associated with a feeling of "tightness across the chest," or a sensation as if a lump of food was under the sternum. Aching and pain may then be traced over the lines of the bronchial tubes, while the dry hacking cough increases the discomfort and seems to strain the tubes till each one can be outlined on the chest wall by the patient. The cough, when it occurs, is virtually unproductive, and often hurts the larynx and throat. On making a physical examination by auscultation there will be found over the posterior aspect of the chest, between the shoulder-blades, increased sounds of bronchial breathing, which is rougher than normal, due to the air passing over an inflamed, swollen, and roughened mucous membrane. This bronchial roughening may be sufficient to cause a harsh respiratory sound over the entire chest, and expiration may be heard a little louder than usual. No other changes from the normal can be noted, but isolated spots of discomfort may be pointed out by the patient where aches, "catches," or "kinks" seem to be present in a previously normal tube. Percussion, palpation, and inspection show nothing more of note.

If possible the patient is to be put to bed and ordered, if he be strong and hearty, and if the signs of inflammation are severe enough to cause alarm, a free dose of pilocarpine for the production of a sweat, particularly if there is a great necessity for rapid cure without regard to the nausea which may be produced by the drug. If this is done no other medicine need be used, but the employment of a mustard foot-bath and a drink of hot brandy or whiskey and water should be ordered.

If, for any reason, this treatment is not called for, and in many cases it will be found unnecessarily severe, the pilocarpine may be replaced by full doses of 2 to 3 drops of the tincture of veratrum viride or a teaspoonful of the wine of antimony in adults, or ½ to 1 drop of the tincture of aconite in children, the employment of hot drinks and a foot-bath being also insisted upon.

The use of antimony as a remedy in the early stages of bronchitis should only be resorted to when a very powerful action is required and the individual *very* strong and sthenic. Under these circumstances it may be given in full enough dose to produce marked nausea and even vomiting with a profuse sweat. Along with the depression a profuse outpouring of liquid takes place in the bronchial tubes, which speedily relieves their congestion, and in consequence brings on the second stage of the disease in an hour or two instead of in two or three days. Unless some pressing need requires it, most persons will regard this remedy as worse than the disease.

Counter-irritation may be applied to the chest in the shape of a mustard or spice plaster, or dry cups may be employed, several on each side of the vertebral column, at about the sixth rib. If the soreness of the bronchial tubes is not relieved by this means, inhalations of steam arising from boiling water placed before the patient may be practised, either by means of a cone covering the top of a pitcher and the mouth and nose of the patient, or by covering the head and pitcher with a towel. The usefulness of this method may be much increased by the introduction of one tablespoonful of compound tincture of benzoin to each pint of water. In children, both in this first stage of bronchitis and in the later stages, the use of the so-called "bronchitis tent" is of great value. It consists of a canopy raised over the bed, a sufficient distance to allow of plenty of air, through one side of which passes a tube leading from a tin pail or kettle of boiling water, under which is an alcohol lamp to keep the temperature of the water sufficiently high. By this means the air breathed by the child is so saturated with moisture that the mucous membrane lining the air-passages is soothed and quieted. In order that the full benefit of this measure be understood, it must be remembered that a mucous membrane in the early stages of inflammation is always dry and red, lacking its normal moisture, and that the upper air-passages fail to catch upon their surfaces, by reason of their dryness, particles of dust, and do not moisten the air before it reaches the lungs. Again, it will be remembered that the bronchial mucous membrane is covered with ciliated epithelium which, by its constant upward wavy motion, urges out of the lung all impurities. Dryness of the surface at once stops this ciliated movement with unfavorable results. The employment of the "bronchitis tent" is equally useful in adults, but less readily employed owing to the size of the bed. Poultices may be used, and while the cardiac sedatives are acting, resort should be had to ipecac and citrate or acetate of potassium, which act as sedatives to the inflamed mucous membranes and aid in the formation of secretion, moistening the surfaces and thereby overcoming the dryness and irritation. The potassium salts also act as a febrifuge and should be used in full doses, as much as 40 grains to a drachm in a day. The following prescription illustrates their employment:

℞.—Syr. ipecac.		fʒj.
Potas. citrat.		℥iv.
Aq. destillat.	q. s.	f℥vj.

M.—S. Dessertspoonful every four hours for a child of five years.

Or—

℞.—Syr. ipecac.		f℥ij.
Succus limonis.		f℥j.
Potas. carbonat.		ʒiv.
Spirit. æther. nitrosi		f℥j.
Aq. dest.	q. s.	f℥vj.

M.—S. Dessertspoonful every four hours for an adult.

For a child this prescription should be reduced just one-half in each part.

When fever is persistent, quinine should be used, and if the cough be excessive and annoying $\frac{1}{24}$ to $\frac{1}{12}$ grain of morphine may be given in each dose of the solution just given, or a few drops of the spirit of chloroform may be added to the prescription.

Having considered the treatment of the first stage of bronchitis, we pass to that of the second. The condition of the mucous membranes is now quite different from that which we have just been speaking of. In the place of an absolute lack of secretion we have a profusion of cast-off epithelial cells, a large amount of mucus, and more or less liquid poured out upon the walls of the bronchial tubes forming obstructions everywhere to the ready passage of air. The secretion is apt to be more or less viscid, ropy, and in lumps when it is coughed up after considerable effort. This state is one in which the excitement of inflammation is followed by local depression and an effort on the part of the tissues to rid themselves of some of the congestion and useless epithelial formations. The physical signs on listening to the chest are now found to consist in a large number of fine râles which are distinctly wet and moist. Later they become markedly liquid and bubbling, and so large as to cause gurgling on inspiration and expiration. Sometimes they are musical or squeaking. Generally the latter signs do not come on until the case is far advanced, and, if a cure is soon to be reached, they only last a few days or hours, as the mucus is so loose as to be readily coughed up and the lung cleared.

The object of the physician is to use remedies which will, as they are eliminated by the parts, stimulate the bronchial tubes and increase the volume of liquid poured out. For this purpose the bronchitis tent may of course be employed, but the drugs to be used internally are ammonia, chiefly the chloride, and the pitches and turpentines, such as terebene, pyridine[1] or even turpentine itself. Allium or garlic is often of great service at this time or a little later in the course of the ailment. It may be used by boiling garlic in milk, or by the application of an onion or garlic poultice.

In the majority of instances an ammonia mixture will be the best and most serviceable prescription in one of the following forms:

℞.—Ammon. chlor.		ʒij.
Ext. glycyrrhiz.		ʒij.
Aq. destillat.	q. s.	f℥iij.

M.—S. Teaspoonful every four hours.

Or,

℞.—Ammon. chlor.	ʒij.
Mist. glycyrrhiz. comp	f℥iij.

M.—S. The same dose.

The disadvantage of the latter prescription is the presence of antimony in the compound liquorice mixture. If the cough is troublesome a little morphine or belladonna may be added, or the following be used, particularly if any signs of cardiac failure appear:

℞.—Ammon. chlor.	ʒj.
Ammon. carbon.	ʒj.
Ammon. brom.	ʒj.
Ext. glycyrrhiz.	ʒiv.
Aq. dest.	f℥vj.

M.—S. Dessertspoonful every four hours.

In this prescription the first constitutent acts particularly on the air-passages, the second stimulates the heart and respiration, and the third also allays the cough, the liquorice covering the salty taste of the ammonias. Ammonium chloride may be also used in the lung by the steam atomizer or by inhalation of the fumes by means of some of the apparatus used for this purpose, and counter-irritation may do good at this stage, particularly over some aching bronchus, when a blister or plaster may be employed, or even a dry cup resorted to. If the administration of the chloride does not aid in the expulsion and liquefaction of the secretion, and rid the lungs rapidly of the mucus, the use of terebene in 5 or 10 minim capsules may be resorted to with great success. If capsules cannot be supplied terebene may be made into an emulsion with accacia or tragacanth and given in this way. Sometimes terebene will irritate the kidneys and produce a sense of weight across the loins, and if this occurs its use should be stopped. In other cases it will disorder the stomach or cause diarrhœa. These effects are not, however, commonly seen. Certain of the volatile oils and resins are also of value at this time, notably the oleo-resin of cubebs and copaiba, which, however, possesses the disadvantage of disordering the stomach. The oil of eucalyptus is also of great value and may be given in capsule or emulsion in the dose of from 1 to 5 drops every five hours. The oil of sandalwood in the dose of 5 to 10 minims is very valuable and not so apt to disorder the stomach, bowels, and kidneys as are some of the other remedies named. The balsam of Peru and Tolu may be used, but ought always to be combined with other more active drugs. Apomorphia has been highly recommended in the subacute stage of bronchitis as an expectorant for the purpose of loosening the phlegm and increasing secretion. The dose should be from $\frac{1}{10}$ to $\frac{1}{5}$ grain by the mouth, to an adult, three times a day, under such circumstances. Squill has had a very good reputation in this stage of bronchitis, but is a very poor remedy as compared to most of those now in use, irritating the stomach and kidneys and acting comparatively slightly on the diseased area.

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[1] Pyridine, not pyrodine, is used by placing 1 fluidrachm on a hot shovel or saucepan in a small room, the patient breathing the fumes.

While the proper use of these remedies usually brings about the results desired, in others a stage of profuse secretion comes on, which in its treatment is identical with that seen in chronic bronchitis, chronic "winter cough," and emphysema, and they will, therefore, be considered together.

In old persons suffering from dilated bronchial tubes, from emphysema, and from chronic bronchitis there is constantly poured into the air-passages so free a secretion that constant coughing is necessary to rid the lung of enough of the mucus and liquid to enable the man to breathe. Any excess of this exudation drowns him in his own secretions and the constant obstruction of the lung soon produces dilatation and weakness of the right side of the heart. This same condition in a more acute form sometimes asserts itself in young children and in adults. In children it sometimes comes on so suddenly as to be known as "acute suffocative catarrh," while in older persons it appears with sufficient severity to make the condition of the patient most serious. Of the treatment of this state the writer shall speak at once. The objects must be to rid the lung of the liquid secretions, to prevent the outpouring of more exudations and to support the patient through the crisis. Where the exudations rapidly fill the lung nothing is better in the child or strong adult than an active emetic, such as apomorphine, hypodermically, in the dose of $\frac{1}{10}$ grain to an adult, or $\frac{1}{20}$ to a child, and repeated; if this first dose fails to act in ten minutes, ipecac may be used instead in the form of the powder, a small teaspoonful for a man or 5 to 10 grains for a child, or if the powder be not at hand a tablespoonful of the wine or syrup of ipecac to an adult or two teaspoonfuls to a child may be given. Digitalis should be administered to support the heart, and strychnine be employed in full dose to stimulate the respiratory centre and excite the nervous system, which is generally depressed by the increasing carbonic acid in the blood. For the same purpose caffeine or strong coffee may be used. Oxygen may be inhaled and astringent sprays drawn into the air-passages, containing tannic acid, Monsel's solution, or other astringents such as shall be mentioned in a moment. If death seems at hand, hot and cold dashes of water may revive the patient sufficiently to keep up respiratory movements until voluntary efforts are made once more by the patient.

The treatment of the more moderate condition of excessive secretion after bronchitis in old persons, which is more slow in its progress, but which may end as fatally as similar attacks in the young, is somewhat similar to that just given. Injurious results are often produced by the physician failing to recognize that the secretion is sufficiently liquid, and that ammonium and such expectorants are not only useless, but harmful, because they increase the quantity of these liquids. Under these circumstances a fine spray of a solution of tannic acid of the strength of from 2 to 30 grains to the ounce may be used, or of alum solution from a few grains to saturation. Monsel's solution should be employed in the dose of 10 to 15 drops to the ounce of water, or acetate of lead may be used in the strength of from 1 to 15 grains to the ounce. Lobelia induces a too free secretion, and is contra-indicated under such circumstances. The use of opium to check the excessive excretion is a measure of doubtful value, as it checks the cough and causes the lung to become more rapidly filled with mucus. Belladonna, which checks secretion even more than opium, stimulates the respiratory centre, and is for this reason a doubly useful remedy. Counter-irritation may do good, and if the patient be strong free purgation should be resorted to.

In those cases where dilatation of the tubes is present in old persons, calabar bean, in the form of the tincture or extract of physostigma, is of service, owing to its action, as a tonic, on the muscular fibres of the walls of the tubes preventing further bronchial dilatation and aiding in the expulsion of the secretion as rapidly as it is formed.

The use of remedies designed to allay the cough in these cases is absolutely unjustifiable. The question as to whether the cough is excessive or not must depend on the ability of the lung to rid itself of the secretions in its bronchial tubes.

BURNS AND SCALDS.

The treatment of burns and scalds is both internal and external, the first being devoted to the quieting of the nervous system after the shock, the relief of pain and the treatment of the shock while present, and the second to the care of the injured surfaces. Immediately upon being called to a case of burn, it is the duty of the physician to determine how badly shocked the patient is, what the condition of the pulse may be, and whether or not the lungs and air-passages are involved. After these mental notes, he should give a hypodermic injection of $\frac{1}{4}$ to $\frac{1}{2}$ grain of morphine and $\frac{1}{60}$ of atropine, and then roll the entire body in a large quilt to maintain the bodily heat while the sufferer is being transferred to the hospital, or the house to which he belongs.

In some cases the shock is so great that the pulse flags at once, the temperature fails, and collapse ensues. Stimulants hypodermically, external heat, and warm drinks of water and whiskey are indicated, followed by digitalis if the circulation does not respond to the less powerful stimulants.

If time and circumstances permit, the dressings should be applied before moving the patient, but this is rarely possible. By far the best dressing is lint, wrung out of a mixture of linseed oil and lime water, equal parts, or, if desired, the oil may be rendered antiseptic by the addition thereto of 1 part to 20 of carbolic acid, which is also of service in that it acts as a feeble local anæsthetic. These cloths should be renewed every twelve or twenty-four hours, as may be needed, or they may be substituted by lint wrung out of a saturated watery solution of boracic acid.

If the burn is not very diffuse a solution of the tincture of cantharides, 1 part to 40, upon a rag, is said to relieve pain and aid in healing, but if the burned surface be extensive this treatment cannot be resorted to, owing to the irritation of the kidneys, which are already overtaxed by the interference with the function of the skin. In comparatively small burns a saturated solution of carbonate of sodium (washing soda) often does great good in relieving the pain. This action may depend on the solvent power of this salt over albuminous deposits, formed by the heat, which irritate the peripheral nerves.

A large number of other remedies have been and can be used, but are no better than those named, and less generally employed.

A very important point in the subsequent treatment of burns is the remembrance of the close relationship existing between the internal organs, particularly the kidneys, and the cuticle. When we recollect that we try to influence internal congestions, such as pulmonary congestion for example, by the application of irritation to the skin of the chest, we see at once that a widespread and severe burn is a huge counter-irritant and must affect the viscera.

Again, the skin being prevented from exhaling impurities, forces the kidneys to do the work, and, if the kidneys fail under the strain, death results. Whenever the urine is high colored and cloudy the citrate of potassium should be freely given, 20 grains in water three times a day, combined with 30 drops of sweet spirits of nitre.

CHANCROID.

The chancroid is a contagious non-specific ulcer, which has no period of incubation, is distinctly inflammatory in type, and is usually multiple. It is further distinguished from the primary sore of syphilis by the fact that it is auto-inoculable, is not followed by secondary eruptions, and, if it involves the lymphatics at all, produces a monoganglionic unilateral swelling which frequently attains a considerable size, and suppurates.

Chancroid being a purely local affection, would seem to require nothing beyond local treatment; this is true of the uncomplicated sore, but, where phagadena or serpiginous ulceration sets in, the question of constitutional treatment is of paramount importance.

The treatment of uncomplicated chancroid is as simple as it is efficient. One thorough cauterization converts the sore into a healthy ulcer, the cicatrization of which is quickly and surely accomplished.

As the most efficient means of thoroughly destroying the chancroidal ulcerations, the actual cautery is chiefly commended. This is, however, objectionable to patients. Sulphuric or nitric acid will be found equally serviceable. The pain of its application may be greatly lessened by the previous employment of a 20 per cent. solution of cocaine. When the surface involved is large the patient should be etherized. The cardinal part in the cauterization of chancroids is to *reach and destroy all the diseased area.* Every pocket and sinus must be thoroughly acted upon, otherwise it remains as a focus for reinfection. A convenient way of both destroying the chancroid and providing for the after-dressing is offered in the application of Ricord's paste. This is made by adding to finely powdered charcoal enough strong sulphuric acid to form a paste of about the consistency of castor oil. This is then applied to every portion of the ulcer. The acid shortly dries out, leaving a dressing of charcoal which in a few days drops off, exposing a healthy, nearly healed, granulating surface. Where nitric acid is applied the subsequent dressing consists, preferably, in the application of dusting powders, iodoform being the best.

There has been a tendency of late years to substitute for this treatment one less radical, more acceptable to the patient, and in many cases almost equally satisfactory in results. It is certainly true that many of the chancroids as found in persons of robust health show little tendency to spread beyond comparatively narrow limits, and are amenable to mild treatment. It must be remembered, however, that, as long as the smallest portion of such an ulcer remains unhealed, it may, at any time, take on all the features of a virulent ulceration. Moreover, the patient is constantly exposed to the risks of a chancroidal bubo, a complication so troublesome that the possibility of its development constitutes the strongest argument against palliative treatment.

Where the ulceration is entirely superficial, constituting the erosive form of chancroid, iodoform, dusted over the surface of the carefully cleansed granulations, offers the best form of palliative treatment. As a cleansing and stimulating wash, to precede the application of the iodoform, nitric acid ʒj to water Oj is most satisfactory. The objection to iodoform lies in its disagreeable and penetrating odor. To prevent this great care should be exercised in applying the powder to see that none is distributed elsewhere than upon the sore. The odor can also be disguised to an extent by thoroughly mixing with the iodoform a small quantity of one of the essential oils, such as oil of peppermint or attar of roses, using not over ♏ v to ʒj of the powder. There is no dusting powder which can entirely take the place of iodoform, yet when the objections to the use of the latter are insuperable iodol may be substituted, or a mixture of zinc oxide ʒj and bis. subnit. ʒiij, or equal parts of calomel and bismuth. Where the discharge is profuse, powdered tannin may be combined with the dusting powder in the proportion of one part to four.

In the ordinary uncomplicated chancroid these dry dressings are greatly to be preferred to wet applications; when, however, the sore is attacked by a high grade of inflammation, and becomes indurated, prolonged immersion of the part involved, or of the whole body, in hot water may be followed by the application of dressings kept constantly wet with the dilute nitric-acid lotion, as given above, or with weak carbolic solution, 5 grains to the ounce of water, or with lead water and laudanum. Where the chancroid assumes the phagadænic type, extending with great rapidity and causing extensive sloughing and destruction of tissue, free cauterization, either with the hot iron or by means of nitric acid, should be instituted immediately, every portion of the ulcerating surface being thoroughly destroyed. This should be followed by prolonged hot sitz-baths or general warm baths, the patient remaining in the water for days at a time, if necessary, and, if practicable, eating and sleeping with the body still immersed. If this is not possible, baths of from two to four hours' duration should be given two or three times daily. After cauterization, powdered iodoform is the best local application in phagadænic cases. In addition the patient may be given full doses of opium, and should receive a tonic and supporting treatment.

Should the chancroid assume the serpiginous type, slowly extending in spite of treatment, till, in the course of months or years, large areas are destroyed by the process, the warm bath continued night and day for weeks at a time, together with thorough cauterization of the entire diseased surface with the hot iron, represent the most satisfactory methods of treatment.

The chancroidal bubo is best avoided by prompt and thorough cauterization of the sore; when it occurs, however, it should be first treated by rest, pressure, and counter-irritation, since it may be a simple inflammatory adenitis, and, with care, may not run on to suppuration. Iodine may be painted *around* the swollen area, the patient should be put to bed, and a compress, together with a spica bandage of the groin, should be applied, or this may be substituted by a wet bag placed upon the inflamed gland. At the first sign of suppuration the bubo should be opened freely, should be washed out with bichloride solution, 1 to 1000, peroxide of hydrogen, half strength, or chloride of zinc, grains 40 ad. ℥j aq., and should be packed with iodoform gauze. If the bubo takes on phagadænic action it should be treated precisely as the phagadænic chancroid.

CHOLERA, ASIATIC.

The treatment of this exceedingly dangerous disease is prophylactic, curative, and convalescent.

The first measures consist of strict quarantine, both public and private, the avoidance of all water for ordinary purposes which has not been boiled at least an hour, and cooled in a place devoid of germs, and the employment of those foods which, while preserving the normal bodily health, in no way predispose to intestinal disturbances, as do some of the fruits, as melons and grapes. If these things are attended to, little remains to be done; but it is worthy of remark that sulphuric acid, perhaps by its anti-diarrhœic influence, is a drug which is harmless in itself, yet apparently one which is possessed of distinct prophylactic power in this disease.

The treatment of the attack itself is supportive, and directed to the curtailment and modification of the symptoms shown. Above all things the diarrhœa must be controlled, if this is possible, since it saps the strength and induces the collapse which ends in death. To this end 10 drops of aromatic sulphuric acid may be given every two hours and may be accompanied by 5 or 10 drops of the strong spirit of camphor and 20 drops of laudanum until constitutional symptoms prohibit the further use of the opiate. If the vomiting is too severe to permit of the use of the laudanum by the mouth, morphine should be given hypodermically, and it is to be remembered that this treatment may be resorted to even in the stage of collapse. Sometimes the spirit of chloroform in 5 to 10 drop doses every hour is of great service. The remembrance that the purging must be constantly decreasing the liquids in the tissues, thereby altering the constituency of the blood, renders it evident that some means must be taken to replace the salts and water lost. For this purpose large draughts of water are to be employed, and, if possible, the following salts should be placed in it, the proportions being 100 parts of a saturated solution of tribasic phosphate of lime and 5 parts of a one per cent. solution of potassium chloride. This fluid is very nearly identical with the blood physiologically, and may also be used intravenously with great success in place of defibrinated blood, to which it should always be preferred. No food must be given by the mouth during an attack if it can be avoided, but nourishment is to be obtained chiefly by way of the rectum, using predigested milk or beef-broth. Friction of the arms and legs as well as of the trunk is often a comfort, and the use of hot broths tends to put off the algid stage. To control the vomiting small doses of cocaine may be employed and a turpentine stupe applied to the belly.

Very recently Harkin has written in high praise of the so-called "vagus treatment" of cholera and has recorded cases in his own and others' practice which reached brilliant cures by the use of a fly-blister over the course of the vagus nerve on both sides of the neck, just beneath the angle of the lower jaw. The explanation of this treatment rests in the belief that cholera is dependent upon some impairment of the functions of this nerve in the abdomen.

CHOLERA INFANTUM.

Cholera infantum is a term often applied to all the forms of active serous diarrhœa afflicting children in the summer months, whether its cause be exposure to high heat or bad food or both. In reality the term should be applied to that form of serous diarrhœa in which heat is the most common cause, and in which symptoms of lowered vitality and collapse rapidly come on with coldness of the extremities, pinched face, and wrinkled skin. The treatment by drugs is identical in all forms of serous diarrhœa in children so far as the purging is concerned, but the removal of the cause requires greater care in its discovery and more skill in its cure.

In cities, particularly where the heat is often great, the air damp and impure, and the food not always fresh, cholera infantum often appears as a form of thermic fever or heat exhaustion, or, in other words, as sunstroke. In these cases the temperature in the rectum will be found febrile, while that of the axilla is below normal, and as pyrexia does harm to the internal organs the internal temperature must be lowered by cool drinks, pieces of ice, and the careful use of antipyretics. The diarrhœa in this case is dependent upon a relaxation of the bloodvessel walls in the intestine by reason of the influence of high heat over the splanchnic nerves, and may also be partly due to irritant matters derived from food, and resulting from poor secretion of the digestive juices. If the thermometer placed high up in the rectum shows a subnormal temperature, heat exhaustion is present, not thermic fever, and the treatment is reversed: Hot drinks are to be used, external heat applied, and friction of the limbs resorted to, or the child may be put in a hot bath at a temperature of 105° F., its temperature being carefully watched lest it rise suddenly to above the normal. Vomiting is nearly always a prominent symptom in cases of cholera infantum, and it is best under any circumstances to use predigested milk in teaspoonful doses every fifteen or twenty minutes. If vomiting is active and collapse is threatened, a few drops of good brandy should be used in each teaspoonful of nourishment.

There is another form of cholera infantum which is not due to a high atmospheric temperature alone, but more commonly to the ingestion of irritant foods or foods unsuited to a child, obtained surreptitiously or through the ignorance of the parents. If there is such a history, and none of the masses of undigested food have been passed, a purgative dose of castor-oil (1 to 2 teaspoonfuls to a child of two years) with 20 drops of paregoric should be used to sweep out the offending materials and allay irritation, and be followed at once by the treatment which will be spoken of in a moment. Care, of course, should be taken to maintain the bodily heat or lower it if it is above the normal, and a watch must be kept upon the pulse and breathing to note any changes requiring stimulants.

The diarrhœa must be stopped at once to save the tissues, while the medicinal treatment should consist in the use of a mixture such as the following, for a child of a year or eighteen months.

℞.—Acid. sulph. aromat.	gtt. xxiv.
Tr. opii camphorat.	fʒiij.
Elixir curacoæ	fʒij.
Aqua cinnamomi . . . q. s.	fʒiij.

M.—S. Teaspoonful every two hours.

Or,

℞.—Acid. sulph. aromat.	gtt. xxiv.
Ol. caryophylli	♏viij.
Tr. opii camphorat.	fʒj.
Spirit. chloroformi.	gtt. xlviij.
Syr. zingiberis . . . q. s.	f℥iij.

M.—S. As above.

If preferred, the tincture of kino, or compound tincture of catechu, may be substituted for the oil of cloves or the spirit of chloroform, and again the extract of hæmatoxylon may be taken in the place of either of these. Where the vomiting is very severe and incessant, the purging profuse, ill-smelling and mouse-like in odor, a rectal injection of starch-water, 3 ounces, containing 10 drops of laudanum, is to be employed, and at the same time $\frac{1}{8}$ of a grain of gray powder (hydrargyri cum creta) given every hour. The gray powder may be substituted by $\frac{1}{12}$ of a grain doses of calomel. Very minute doses of arsenic given by means of the following solution are often of service in checking the vomiting and purging, and should be resorted to if necessary:

℞.—Liq. potas. arsenitis. . . . . . . gtt. j vel. ij.
Aq. cinnamoni . . . . . . q. s. ℥j.
M.—S. Teaspoonful every fifteen minutes till four teaspoonfuls are taken.

In still other cases the remedies named above only stop the diarrhœa for the time being, and it returns as soon as they are withdrawn. In such a case the following is of value to restore the lost tone of the parts involved:

℞.—Resinæ podophyllin . . . . . . gr. $\frac{1}{2}$.
Liq. potas. arsenit. . . . . . . gtt. iij. vel vj.
Liquor calcis . . . . . . q. s. f℥iij.
M.—S. Teaspoonful every 5 hours, or a powder may be used.

℞.—Resinæ podophylli . . . . . . gr. $\frac{1}{4}$.
Pulv. ipecac. . . . . gr. j.
Sac. lact. . . . . gr. xx.
M. ft. in chart., No. x.—S. One powder every five hours.

A very important, never-to-be-forgotten measure in cholera infantum is the use of counter-irritation over the belly by means of a mustard plaster (1 part mustard flour to 4 of wheat flour) or a spice plaster. The plaster should be renewed as often as it cools, and kept on continuously if the skin will stand it.

CHOLERA MORBUS.

This acute, painful, rapidly exhausting disease arises from exposure to cold, the ingestion of poisonous or irritating foods, exposure to excessive heat, and to a number of similar causes.

In reality it may be regarded in one instance as a gastro-enteritis, and in another as an acute serous diarrhœa associated with much pain of a griping, rending character. Nothing compares to counter-irritation for the purpose of affording relief. A large mustard or capsicum draft should be placed over the abdomen and allowed to remain as long as it can be borne. If the patient knows that he has taken irritant foods, castor-oil with laudanum added to it to prevent griping should be employed to sweep out the offending masses before any other remedies are used, and be followed by a diarrhœa mixture such as here follows:

℞.—Acid. sulph. arom. . . . . . . fʒ ij.
Ext. hæmatoxylon . . . . . . ʒ ij.
Spt. chloroformi . . . . f℥ ss.
Syr. zingiberis . . . . . q. s. f℥ iij.
M.—S. Teaspoonful every two hours.

CHLOROSIS.

(See Anæmia.)

CHOREA.

St. Vitus's Dance is a more or less obstinate nervous affection, generally occurring in children, yielding to treatment quite rapidly in some cases and in others remaining persistently severe, and even becoming worse under the physician's care.

The disease is always to be treated by the removal of any sources of reflex irritation, such as worms, a long prepuce, or other trouble of this character, and in the avoidance of punishment or severe rebuke on the part of the attendants. Aside from that form of the disease closely associated or dependent upon rheumatism, the profession universally employ arsenic in one of its preparations as a specific remedy. Generally Fowler's solution is used, and unless the parents are intelligent enough to drop medicine carefully from a bottle or dropper, the physician should order a three-ounce mixture, so that each teaspoonful will contain two drops of the drug. Very frequently, to be effective, arsenic must be used in ascending doses, increased one drop a day, and, in consequence the dilution first spoken of, has to be avoided and the importance of care in measurement urged upon the patient's relatives.

Whenever arsenic is used the physician should instruct the attendants to stop administering the drug if any puffiness under the eyes is seen in the morning on arising from bed, or if any pain in the bowels ensues, as these signs show that the full medicinal action of the drug is being felt. Where arsenic fails, cimicifuga in the dose of 20 to 30 drops of the fresh fluid extract to a child of ten years may be used as the next best remedy.

Where the disease is associated with rheumatism, near or remote, the salicylates or iodides may be of value, and should be thoroughly tried.

In some cases of chorea the muscular jerkings are so severe that sleep is impossible and the patient has to be held in bed and the bed-covers tied down. These cases will often obtain a quiet night by the use of the hot pack at bed-time. The child should be placed in a blanket previously dipped in as hot water as can be borne by the patient and thoroughly wrapped up in another dry blanket, to retain the heat, and allowed to sweat. Care must be taken that a heat-stroke does not result, and, if sweating does not come on and and oppression ensues the blanket must be removed. The sheets should be ironed to have them warm for the patient when he is returned to bed, and it is often better to let him sleep between dry blankets.

The efficacy of this treatment is largely increased by the use of a dose of bromide of sodium or potassium and a little chloral, as follows:

℞.—Chloral . . . . ʒij.
Sodii. bromid. . . . . ℥ss.
Aq. . . . . q. s. f℥iij.
M.—S. Teaspoonful in water every five hours for three doses.

The nitrate and oxide of silver have been largely used, but are not reliable remedies in this disease. The dose of the first should be ⅛ to ⅙ grain, and of the second ⅙ to ¼ grain in pill form.

COLIC, HEPATIC.

This exceedingly painful condition, due to the passage of a gall-stone through the bile-ducts, is always associated with faintness, nausea, and great agony.

The object of the physician must be to relieve this pain, not only by the use of anodynes, but also by aiding in the escape of the stone into the bowel. To relieve the pain a hypodermic injection of morphine ¼ to ½ grain accompanied by $\frac{1}{60}$ grain of atropine is indicated. The opium not only decreases the pain but allays spasm, and the belladonna relaxes the spasm of the muscular coats of the ducts and allows the stone to pass through the relaxed passage-way. Hot applications, such as a turpentine stupe, may be used over the liver but relaxation is *not* to be obtained by the use of nauseating emetics, as the retching may rupture the distended gall-bladder. Severe rubbing should not be used for the same reason.

Very recently the use of olive or cotton-seed oil has come largely into use in this affection, and while we are not sure of the means by which it acts, the studies of Rosenberg and others point to the changing of the oil into glycerin and fatty acids, the first of which liquefies and increases the flow of bile. The oil is used during the attack of pain, and must be swallowed in the dose of half a pint at least, smaller quantities do not suffice. Its action may be aided and its retention in the stomach promoted, by the addition of a drachm of ether to each dose.

Shortly after the oil is swallowed, sudden relief often occurs, due to the escape of the stone into the bowel. The passage should then be carefully watched for gall-stones, but care should be taken that the lumps of soap which are passed, made from the oil by the alkaline juices in the intestines, are not mistaken for true biliary calculi. If the pain does not yield to morphine, chloroform or ether may be inhaled for the relaxation of the spasm and the relief of pain.

The treatment of the state predisposing to the formation of hepatic calculi is largely that of a moderate, regular diet devoid of much fats, wines or beers, and in the following of an out-door life.

CONJUNCTIVITIS.

Simple conjunctivitis requires the use of a boracic acid lotion (gr. 10 to the ounce), and if there be much muco-purulent discharge eversion of the lids and the application of a 2 to 5 grain solution of nitrate of silver. During the subsidence of the inflammation, and if it shows any tendency to become chronic, sulphate of zinc (gr. 2 to 4 to the ounce), either with or without boracic acid, may be dropped into the eye, or sulphate of alum (gr. 4 to the ounce), or the local application of an alum stick. Much inflammatory reaction in this disease may be alleviated by cold compresses. These are rendered more efficacious if dipped in equal parts of water and the extract of hamamelis.

Burns of the Conjunctiva.—Immediately after the accident all foreign particles should be removed or neutralized with a weak acid or alkaline solution if a liquid caustic or acid solution has entered the eye; then a few drops of cod-liver oil may be instilled and atropine employed (suitably incorporated with liquid vaseline) to prevent iritis. The chief danger lies in the formation of severe corneal inflammation and symblepharon; the latter may sometimes be prevented by daily breaking up the granulation tissue or by the insertion of a piece of gold-beater's skin between the inner surface of the lids and the eyeball. The associated conjunctivitis and keratitis require treatment differing in no way from that described in the idiopathic forms of these affections.

Chronic conjunctivitis may result from an antecedent acute inflammation of the conjunctiva, or exist as an idiopathic affection, especially in elderly people in whom it sometimes becomes a troublesome symptom, especially if complicating cataract. The characteristic lesions are roughness of the papillæ of the conjunctiva, swelling of the caruncle, and soreness of the angles of the eyelids. There are no granulations, although the disease is sometimes inaccurately spoken of as granular lids. A soothing wash is indicated (10 grains of boracic acid to the ounce of water) to which may be added 2 grains of cocaine, provided the cornea is not ulcerated, and for which a similar boracic acid lotion with 4 grains of salt to the ounce may be substituted. A very suitable local application is *lapis divinus* (sulphate of copper one part, alum one part, nitrate of potassium one part, fused together, and camphor equal to one-fiftieth of the whole added. The mass is run into sticks and the application made to the everted lids, or 1 grain of the same preparation to the ounce of water may be dropped into the eye). Other useful applications are tannin and glycerin (gr. 10 to the ounce), yellow oxide of mercury salve, and alum crystal. If refraction error exist this should be corrected. It is to be remembered that chronic conjunctivitis distinctly complicates any operative interference in the eye, as, for instance, cataract extraction.

Chemosis of the conjunctiva, in which this membrane is infiltrated with serum, is usually a symptom of other ocular disorders, and subsides with the general treatment directed to their relief. Good results may follow nicking the swollen tissue with a pair of scissors; the application of a warm, moist compress, and the use of astringents, especially alum.

Diphtheritic conjunctivitis is rare in this country, but on the continent of Europe occasionally occurs as an epidemic. It may appear alone or in association with diphtheria of the throat and nose. The initial subjective symptoms are those of purulent ophthalmia; the characteristic objective symptoms, a board-like infiltration of the lids with a deposit of gray membrane upon the palpebral conjunctiva. More than in any single eye disease destructive inflammation of the cornea is threatened. In the early stages the eye should be frequently cleansed with boric acid or bichloride of mercury solutions, and atropine instilled, while hot compresses help to make the nutrition of the cornea more perfect than the cold compresses which were formerly recommended for antiphlogistic purposes. Tweedie has highly recommended a solution of quinine (gr. 3 to the ounce); Burgomaster insufflation of flowers of sulphur; while in France the local application of lemon juice or citric acid ointment has been endorsed; Galezowski uses oil of cade (1 to 10). In the early stages all caustics are contraindicated; after absorption of the membrane and reëstablishment of the discharge the cautious use of nitrate of silver in the manner described under purulent ophthalmia may be employed. The constitutional measures for diphtheria are necessary.

Follicular conjunctivitis, a disease sometimes mistaken for granular lids, but having a distinct clinical difference, requires for its local treatment weak astringents and antiseptic lotions, and the application to the swollen follicles of an ointment of sulphate of copper (gr. ½ to the drachm), dusting in calomel either alone or with equal parts of subnitrate of bismuth, and iodoform used in the same way.

This disease, or one analogous to it, is sometimes produced by the instillation of atropine. If this is its cause then the drug must be suspended and the surface painted with an alum crystal.

Hemorrhage beneath the conjunctiva (subconjunctival ecchymosis) may follow an injury, occur during a paroxysm of whooping-cough, and occasionally, in elderly people, may appear spontaneously. No treatment materially hastens the absorption of the blood unless it be massage of the globe through the closed lid; any associated conjunctival irritation may call for a boric acid and cocaine wash.

Lachrymal conjunctivitis is a name given to a chronic form of inflammation of the conjunctiva, associated with obstruction in the lachrymal duct, and characterized by a tear-soaked appearance of the eye, small pustules at the roots of the lashes, and a gummy discharge along the palpebral margin. This can only be cured by relief of the stricture of the nasal duct which causes it, but may be alleviated with the same remedies recommended in the treatment of chronic conjunctivitis.

Muco-purulent conjunctivitis.—This disease differs from the former only in the presence of a greater amount of discharge. The same antiseptic lotions may be employed, to which may be added, with advantage, bichloride of mercury (grain 1 to the pint). Here, nitrate of silver (grains 10 to the ounce), applied in the manner already described, and with careful neutralization of the excess, with either a solution of salt or washing it away with tepid water, may be practised. Poultices or bandages should be applied.

Purulent conjunctivitis, which is commonly seen in the adult in the form of gonorrhœal ophthalmia, and in the infant as ophthalmia neonatorum, is produced in both varieties by the introduction into the eye of a specific virus from either the urethra or the vagina. The chief danger of the disorder is destruction of the vitality of the cornea and loss of sight. The most important indication is to prevent this danger by reducing the amount of swelling of the lids and conjunctiva and the profuse discharge, which are the characteristics of the disease. These indications are met best in the following manner: Hourly cleansing of the eyes with an antiseptic solution, preferably bichloride of mercury (1 to 7000), or a saturated solution of boracic acid. During the acute inflammatory stage, and before the discharge is profuse, astringents and cauterants must not be applied. When this stage has arrived, and the conjunctiva is profusely covered with discharge, the lids should be carefully everted once a day, wiped clean of every particle of pus, and carefully touched with a solution of nitrate of silver (grains 10 or 20 to the ounce), and the excess neutralized with a few drops of a solution of common table salt. In the early stages, iced compresses wrung out of carbolized water and frequently changed, will help to reduce the reaction, or these compresses may be made by placing squares of lint upon a block of ice and thus securing intense cold. If the vitality of the cornea is threatened it is advisable, in many instances, to substitute for the cold applications hot compresses of a temperature of 110° F. These may be applied for from ten to twenty minutes every two or four hours, according to the exigencies of the case. The appearance of ulceration in the cornea calls for the use of either atropine or eserine. Atropine was formerly employed almost exclusively; in recent times great success has followed the adoption of eserine. This is especially applicable if the ulceration should form in the periphery of the cornea. In adults, high reaction and violent inflammation may be alleviated by the use of leeches to the temple. Bleeding of any sort is not applicable to newborn infants. Other applications which have met with favor at the hands of various surgeons are solutions of sulpho-carbolic acid, sulphate of alum, sulphate of zinc, nitrate of silver, creolin (1 per cent.), and iodoform ointment. Miles has especially recommended a treatment with alcohol and corrosive sublimate. The preventive method of treating ophthalmia neonatorum that has obtained the happiest results is that instituted by Credé, namely, the dropping of a two per cent. solution of nitrate of silver into the eyes of the newborn infant. If one eye alone is attacked in gonorrhœal ophthalmia the other should be protected by covering it with Buller's shield, which consists of a watch-glass fixed in a square of plaster, which is carefully applied so that the crystal comes directly in front of the eye, and the plaster covers the surrounding area.

Xerosis of the conjunctiva, depending upon a cicatricial metamorphosis and the absence of normal moisture, is seen after long-standing inflammations (granular lids, diphtheria, pemphigus), and is incurable. The affection may be relieved by the local use of glycerin, almond oil, emulsion of cod-liver oil, or the use of weak alkaline solutions. Transplantation of the rabbit's conjunctiva has been tried without success.

CONSTIPATION.

This troublesome state depends on a number of causes, the most common of which is the following of a sedentary life totally devoid of the exercise intended to keep active intestinal and hepatic secretion. Another frequent cause is simple laziness, which causes the patient to resist the call of the bowel for evacuation until this part of the body beomes indolent and atonic, while modesty often causes the condition in females, because a woman prefers to suffer rather than go to a closet which may be somewhat publicly situated. In other instances constipation seems to be hereditary and to depend upon deficient nerve-supply, or muscular weakness and lack of secretion in the lower bowel, or to hepatic torpor.

Whatever the causes are they should be sought after and, if possible, removed, the physician not being content to order purgatives which, while they may give temporary relief, soon lose their power.

Further than this, it must be remembered that hygienic measures always take first place in the method of treatment, and, if possible, drugs should carry out a very secondary *rôle*. Particular attention should be paid to diet and the physiology of peristalsis must be well borne in mind.

It has been proved by a large number of studies, both in the ordinary gut and by the use of purgatives, that peristalsis is almost entirely a reflex action depending for its existence upon the integrity of the nervous plexuses in the intestinal walls, namely those of Auerbach and Meissner, the first of which are situated between the longitudinal and circular muscular fibres which they supply, the latter existing in the submucosa and supplying the walls of the villi, the glands of Lieberkühn, and the small arteries and venules.

It has also been found that the vagus nerve, when stimulated reflexly or directly, increases peristalsis, and that moderate stimulation of the splanchnic decreases it.[1] It at once becomes evident that any decrease in the normal activity of these nerves and nerve centres must speedily result in constipation, and the costive condition consequent upon hepatic torpor is due to the fact that the intestinal walls do not receive the proper stimulation from the bile to set in motion a reflex wave, the result of which will be purgation. This fact rests upon direct experiment that proves the bile to be primarily an intestinal stimulant, antiseptic, and promoter of secretion.

Other series of experiments have found that the circulation of the blood through the intestines greatly influences peristalsis, and disorders in the blood-supply readily bring on intestinal disorder.

The deductions to be drawn from these facts are many. In the first place, it is evident that the maintenance of an active, normal circulation of blood in the abdomen and a free pouring out of bile from the liver and gall-bladder is necessary to healthy peristalsis, and we find that aside from drugs we have a number of remedial measures which are to be resorted to according to the means of the patient. By far the best of these is horseback exercise for at least an hour a day, or every other day, which, by the motion, readily stirs up and excites the abdominal viscera as no other measure can do. If for any reason horseback exercise is impossible, then abdominal massage carried out by a capable *masseuse* is to be tried, the hands following more particularly the course of the ascending, transverse and descending colon, and the kneading movements being devoted to the hypochondriac regions. If neither of these measures can be used then the patient must resort to those gymnastic movements which involve the abdominal muscles, either by the use of dumb-bells or pulleys, such as are sold under the name of "home gymnasiums," or by bending the body forward, backward, and laterally with the fists pressed into the hypogastrium.

At the same time that these measures are directed the diet of the patient must be so regulated that the food shall contain a large amount of residue—that is, after digestion enough of the husk of the grain or enough vegetable fibre must be left free in the intestines to form a stimulus to the intestinal wall. If a meat diet is largely used so little residue is left after digestion that constipation ensues, but if vegetables are largely eaten the reverse is the case. No better evidence of this can be adduced than the hard clay-like passages of the dog and the soft passages of the cow. Very often a plate of cracked wheat (wheaten grits) at breakfast each morning, or the use of bran bread, will relieve a chronic tendency to constipation. In these cases, above all things, milk is to be avoided, since it is almost entirely assimilated and leaves no residue though it supplants other foods. Green or canned corn is of great service. Fruits do good in constipation in one of two ways, either they contain residuous materials or sufficient vegetable-acid salts to be laxative. Figs, by reason of their many small seeds which scrape the mucous membrane during peristalsis, are particularly valuable, and apples, prunes, dates, and tamarinds are all useful. It must be remembered that strawberries, raspberries, and blackberries are generally constipating rather than purgative. In regard to drink, nothing is so good as a cold glass of water taken on arising in the morning or just before breakfast, or if the cold cannot be borne then a glass of as hot water as can be swallowed may be substituted. Coffee is constipating to most persons, largely because of its empyreumatic oil, and tea has the same tendency because of its tannic acid. Brandy, as every one knows, is distinctly constipating, and whiskey possesses so little power to the contrary as to be valueless. Beers differ in their properties, some of them increasing and some of them decreasing intestinal activity.

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[1] Some persons believe that Meissner's plexus receives impulses from the walls of the intestine and transmits them to the motor plexus of Auerbach, which then set in motion peristalsis.

The patient suffering from constipation should go to stool regularly after breakfast every day, even if the attempt is abortive and so train the bowel to expect a movement at that time.

The use of drugs for the relief of constipation is capable of division into two parts. First, the employment of remedies to unload the bowel which has become filled; second, the use of drugs which will so influence the intestines as to cause evacuation and normal activity, or, in other words, drugs which will cure the tendency instead of giving temporary relief. Of the first class we find the various purgative salts, jalap, colocynth, senna, mercury in all its forms, castor oil, and rhubarb; of the second class, aloes, cascara sagrada, manna, tamarinds, rhamnus frangula (Buchthorn), phosphate of sodium, and small doses of podophyllin. The physician should bear in mind that defecation is a normal, physiological act which must be continued all through life, and it is almost as foolish to stimulate the bowel continuously to peristalis as to employ perpetually heart stimulants or respiratory excitants.

Although they are habitually employed in daily doses the purgative salts are exceedingly harmful in such instances, rapidly losing their power and decreasing the patient's strength by the abstraction of liquids and salts from the blood. They often produce anæmia when constantly used. These salines are to be employed simply to unload the bowel when an excess of fæcal matter has accummulated, or when irritant materials are to be swept out of the alimentary canal. In some rare instances, where great plethora exists, a course of Hunyadi water, Friedrichshall or Carlsbad waters is of service, but these are indeed rare instances in America. Jalap, colocynth, and senna are not to be used constantly, as they are too active, and the reaction from their effects causes constipation. Rhubarb is commonly used, but is of its class peculiarly unfitted to its task. Although it purges it is distinctly astringent, and is therefore more constipating in the end than if no drug was used.

Mercury is exceedingly harmful if used as a continued purge and is the cause of much ill-health, bad teeth, and digestive troubles. Castor oil is notorious for its tendency to cause ultimate constipation.

Of the curative class of laxatives none compare to cascara sagrada, particularly in the form of the tasteless fluid extract or cascara cordial. Originally this drug as prepared was very bitter but it is now made almost tasteless by certain manufacturers. This is the only drug which alone moves the bowels and at the same time tends to make future passages more easy and regular; the dose is 10 to 20 drops of the fluid extract, or 1 drachm to 3 of the cordial. There is almost no griping produced by it. For the regulation of the bowels of young children, particularly if they are somewhat "rickety" in tendency, phosphate of sodium in the dose of 5 to 10 grains in milk is the best laxative and the same salt may be used in 30 to 60 grain doses in adults. Manna is to be classed as a laxative fruit, but even it sometimes makes the intestinal torpidity ultimately much worse. The two remaining drugs of this class, aloes and podophyllin, should always be used in combination with other non-purgative drugs, as is seen in the following formulæ:

℞.—Aloes soc.	gr. xx.
Ext. nuc. vom.	gr. iv.
Ext. physostig.	gr. iij.
Ext. belladon.	gr. iv.

M.—Ft. in pil. No. xx. S. One pill at night or night and morning,

Or,

℞.—Resinæ podophylli.	gr. ij. to iv.
Ext. nuc. vom.	gr. iv.
Ext. physostig.	gr. iij.
Ext. belladonnæ	gr. iv.

M.—Ft. in pil. No. xx. S. One as above.

The object of using these other drugs is seen at a glance. We have already learned that nearly all purgatives tend to produce griping. The nux vomica acts as a bitter tonic and stimulant and prevents subsequent atony of the mucous membrane as well as increases reflex action and consequently improves peristalsis. The physostigma is a tonic to the unstriped muscular fibre and gives it strength; the belladonna aids peristalsis by depressing the inhibitory fibres of the splanchnic nerves by allaying spasm and by decreasing griping. In using these drugs, aloes and podophyllin, we should remember that aloes is slow and acts particularly on the lower bowel, and that podophyllin acts chiefly on the upper bowel and is the slowest purge in the list of purges.

In the flatulence of old persons associated with constipation a little asafœtida or capsicum should be added to the pill of aloes just named.

In some instances constipation arises from reflex irritation, as ovarian or bladder trouble. This form may resist all purgatives and yield to opium or to tobacco which quiet reflex action. Tobacco depresses the inhibitory nerves of the gut, and devotees of the "weed" often use it as a laxative.

The employment of enemata is to be discouraged as a routine practice. In cases where it is necessary to use them for temporary relief, and to get rid of flatulence, a little soap, common salt, or a few drops of turpentine may be added to the water. Recently the injection of glycerin (1 to 2 ounces) has been largely resorted to, either pure or diluted one-half and this method has been improved upon by the use of glycerin suppositories containing several drops of the drug. Glycerin acts in these cases as an irritant to the mucous membrane and causes secretion by this means and its abstraction of water from the tissues which it carries out by reason of its hygroscopic powers.

CORNS.

These troublesome formations are best treated by the use of salicylic acid, the following formula being applied night and morning for several days, after which the part should be well soaked in hot water when the entire corn will readily come away, or in some cases several attempts will be necessary.

℞.—Acid. salicylic.	gr. xxx.
Ext. cannabis indicæ	gr. x.
Collodii.	f℥ ss.

M.—S. Apply with a camel's-hair brush.

The same acid may be used in alcohol, and lactic acid in the same proportion is often of service.

In the so-called "soft-corns" with much inflammation the foot should be washed and dried, and a saturated solution of nitrate of silver, 60 grains to the drachm, applied to the part every four or five days.

CORYZA.

Coryza, or ordinary cold in the head, is an acute inflammation of the mucous membrane of the nose; a disease of so frequent occurrence during our changeable spring and winter months that it rarely receives the attention that it deserves. As it is in most cases the point of departure from health toward chronic nasal catarrh, its complete cure, in each instance, is a matter of importance.

Among the causes of coryza are exposure to cold or dampness, wet feet, checking secretions, and lowering the tone of the mucous membranes by inhaling close or impure air. It is also caused by inhaling dust, acrid vapors or gases, as bromine, chromic acid, and pyrethrum, or Persian insect powder.

Permanent changes occur in the nasal mucous membranes where the exposure to irritation is long continued.

Hay-fever subjects are liable to attacks of coryza from very slight causes during any part of the year, the susceptibility increasing, however, as the season approaches for their periodic outbreaks. The exciting agent is usually in the form of *dust* of some kind, though all are not equally sensitive to the same irritant. The rose, the peach, the golden-rod, and rag-weed each has its victim. The writer once treated a woman who could work in wheat flour with impunity, while the same exposure to rye flour at any season of the year produced a violent attack of coryza with uncontrollable fits of sneezing and running from the eyes and nose. By removing the cause and retiring to a quiet, cool room these attacks would pass off in a short time without any other treatment. It is possible to multiply the description of cases of this nature, but their consideration comes more appropriately under the head of vaso-motor disturbances and hay-fever.

Coryza usually commences with a creeping sensation, with or without a distinct chill, followed by constitutional disturbance, as fever, dry, parched skin, pain and aching in the back and limbs. Urine high colored and scanty. Frontal headache varies in intensity from an acute lancinating pain to a dull ache or throb over the brow, increased by leaning forward. The nose and throat at first are dry and parched, the tongue literally "cleaving to the roof of the mouth."

Sneezing, which may occur prominently from the first, is followed by a profuse watery discharge from the nose and eyes. The erectile tissues on the turbinated bones become engorged with blood, producing complete obstruction to breathing. When the swelling causes excessive pressure, the intranasal tissues may become œdematous.

Pressure to this degree, stretching the turbinated tissues and impinging upon the delicate sensory nerves of the septum, causes acute headache, centring over the frontal sinuses or the cheek bones, having a neuralgic tendency to shift its position. The eyes are injected and become suffused on the least exposure to light. Mild delirium may supervene upon pressure in the upper turbinated region, the roof of which, we must remember, is only separated above from the base of the brain by the cribriform plate of the ethmoid bone.

The filaments of the olfactory nerve, piercing the cribriform plate of the ethmoid bone, are distributed to the upper turbinated and the upper half of the middle turbinated bones, and on the septum to about the same level. This region, called from its function, *olfactory*, appears in health slightly lighter in hue than the region below, which is mainly *respiratory* in function.

A few of the reflex disturbances, resulting from changes in intranasal pressure, will be considered elsewhere.

An intense itching of the end of the nose is, with some people, the first indication of an approaching cold in the head. Such people usually have an abundance of stiff hairs in the orifice of the nostrils, and, stimulated by the extra blood-supply to their roots, these hairs gradually erect, and, in doing so, tickle the already hypersensitive membrane of the vestibule of the nose.

During this stage of hypersecretion the amount of watery fluid discharged from the nose is very great, containing in addition to the secretion from the mucous glands, exfoliated epithelial cells, leucocytes, and saline constituents from the blood. The free discharge and constant use of the handkerchief may excoriate the upper lip and alæ of the nostrils, adding to the general discomfort.

The rapid draining of serum produces a degree of weakness and vital depression, apparently disproportionate to the severity of the disease, the exhaustion being indicated by loss of weight and strength, and by pallor.

After a variable period the discharge becomes thicker and less copious, muco-purulent in appearance, and, under favorable conditions, completely disappears in a week or ten days, the discharge gradually drying up, and the swollen membranes regaining their natural tone.

Under less favorable conditions, as in strumous subjects, resolution takes place more slowly, and the discharge remains muco-purulent or purulent for an indefinite period.

The tissues remain more or less thickened, leaving a permanent contraction of the calibre of the nostrils, with slight difficulty in breathing through the nose. A renewal of the cold at this time and increased infiltration or relaxation of the submucous connective tissue leave still greater obstruction. The tendency to recovery is lost, and the condition has become one of hypertrophic nasal catarrh. Inspection of the interior of the nose shows the tissues at first dry and red. The ends of the turbinated bones appear as puffy, red cushions. This congested state may extend to the vault of the pharynx and involve the orifices of the Eustachian tubes, and lead to a train of ear symptoms.

During the stage of secretion the membranes become very much swollen. The erected turbinated tissues completely close the lumen of the nostrils and press firmly against the septum. The same state exists at the back of the nose, and the tissues on the lower or middle turbinated bones may even project into the naso-pharynx, the whole interior surface being bathed with secretion, either serous or muco-purulent, according to the state of the disease. The intense swelling makes an examination rather unsatisfactory at this period. The mucous membrane remains slightly reddened for some time after apparent recovery takes place.

The usual method of treating cold in the head is with "contempt." The patient, as a rule, takes the law into his own hands, only seeking medical advice when an attack of unusual severity arouses his fear of catarrh.

Prompt treatment will often abort an attack of coryza, and, failing in this, will cause it to run a shorter and milder course.

When it is the result of chilling the surface of the body, a Turkish bath may be taken at once. Should this be inconvenient, or too active, a hot mustard foot-bath, with a hot draught or Dover's powder may be sufficient, with rest in bed, to bring on perspiration and a complete relief.

Whiskey, by its power of increasing the capillary circulation of the skin, is a useful remedy, especially where the heart is weak.

It has been clearly proved that whiskey is not equally efficient in preventing an attack, as the first glow is followed by a stage of depression, during which, the resistance to exposure is lessened.

The inhalation of steam charged with such volatile substances as camphor, cubebs or benzoin, may give relief to the congested mucous membranes. Quinine by its action on the nervous system often gives good results, and is universally employed by the laity.

As mucous congestions frequently result from a torpid liver or overloaded bowel, good often occurs from small doses of calomel, or a blue pill, followed by a saline laxative. The saline purge alone, by its revulsive action is often of benefit. Efforts to restore any suppressed secretion should be instituted at once.

Atropine in small doses has given me excellent results, employed during the stage of free watery secretion. It may be combined with small doses of morphine, employing quinine at the same time.

Locally, the use of a mild alkaline or antiseptic wash gives relief, by reducing the inflammation and cleansing the parts from secretion. The following, which is a modification of the well-known "Dobell's" solution, meets the requirements:

℞.—Acid. carbol. (cryst.)		gr. x to xv.
Sodii bicarb. Sodii borat.	āā.	ʒj.
Glycerinæ		f℥j.
Aquæ	q. s. ad.	Oij.—M.

This solution may be used by gently drawing it up the nose, or as a spray from a hand atomizer. When the odor of carbolic acid is objectionable, it may be substituted by menthol, thymol, and eucalyptol in very small quantity. When the membrane is too much swollen to admit such a spray, the local application of a 2 or 4 per cent. solution of cocaine will contract the tissues long enough to allow the employment of other means. Cocaine gives great temporary relief, but its too frequent use appears to increase the congestion afterward.

The alkaline wash may with advantage be followed by the insufflation of the following anodyne powder, known as Ferrier's snuff:

℞.—Morph. sulph.	gr. v.
Bismuth.	ʒ ij.
Acaciæ	ʒ ss.

Fluid cosmoline sprayed into the nose, after cleansing it from secretions, has a soothing effect. The use of severe measures, as irritating snuffs, while they deplete the tissues by increasing the flow, only intensify the inflammation afterward.

The *nasal douche* should be avoided in all conditions of obstruction in the nostrils, especially in obstruction to the outflow of liquids. As a rule, solutions are carried into the nose more readily than from it, and in such a case the hydraulic pressure may force the fluid into the Eustachian tube. This accident is fortunately rare. The writer has the record of only one such instance, in which a physician using the douche for the first time, suddenly felt the water rush into one ear; the hearing was instantly lost and never recovered. The accident occurred some years ago, and the exact condition was not ascertained at the time.

After recovery from coryza, tonics, and especially iron, should be employed to fortify the system against a repetition of the attack.

Important prophylactic measures consist in exercise in the fresh air, cheerfulness, attention to the state of the skin, the use of woollen underwear, avoidance of dissipation, late hours, reading with the head near a hot lamp, dust, draughts, or anything which lowers the vital forces.

CROUP, MEMBRANOUS, AND DIPHTHERIA.

According to a number of prominent physicians, diphtheria is at first a distinctly local disease, the membrane in the throat forming a nidus from which the entire body becomes ultimately filled by the microörganism peculiar to the malady, while others regard the local lesion simply as an evidence of systemic involvement, but as the treatment employed by the best practitioners is almost identical in both cases the author has seen fit not to recognize this conflict of opinion.

The treatment of the throat-changes before the membrane appears should consist in sufficiently large doses of belladonna to impress the system, and it is to be accompanied by painting the pharyngeal wall with a solution of chlorate of potassium of the strength of 15 grains to the ounce, or if this seems too strong only 5 grains to the ounce may be employed. After the membrane is formed its dissolution may be carried on by the use of the atomizer spray with lime-water or with lactic acid solution of the strength of 30 grains to the ounce every hour. In other instances a solution of trypsin, one of the ferments of the pancreatic juice, may be used on a swab or spray to digest the membrane. Other cases do well when a solution of boracic acid is applied dissolved in glycerin in a water-bath in the strength of 1 to 30 and applied to the membrane.

By far the best thing for the physician to do to prevent or limit the exudate, is the judicious use of mercury. This is to be done by employing $\frac{1}{10}$ to $\frac{1}{2}$ of a grain of corrosive sublimate, or by using calomel $\frac{1}{6}$ to $\frac{1}{4}$ of a grain every hour, until the evidences of the action of mercury are shown by the loose stools. It is said that the stools following this use of corrosive sublimate in diphtheria resemble "frog spawn"—that is, are frothy looking. The object in using the mercury is to cause a lack of plasticity in the blood and so to decrease the exudation of fibrine. Having made this attempt, which is only to be tried in sthenic cases, supportive measures are to be resorted to and for this purpose tonics and stimulants with nourishing food are to be employed. Tincture of the chloride of iron, quinine, and strychnine are of service to keep the kidneys active, to stimulate the heart and respiration, and to support the vital forces. The food should consist in pancreatized and sterilized milk. The object is to keep the bacteria limited to the throat, yet with every drink of ordinary milk they are taken into the stomach in a culture medium. It is always best to use an antiseptic spray or swab before giving the sterilized milk, to render the mouth so far as possible antiseptic, and to avoid the gagging, which may cause vomiting of the food if the swab is used afterward.

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Hundreds of other measures have been recommended and employed until almost every one has his favorite method, but the ones here given will be found most generally advantageous in the majority of cases. Where the glands of the neck threaten to suppurate, ice-bags should be applied to the throat and pieces of ice held constantly in the mouth while the tincture of iron is pushed in as full amounts as possible.

If suffocation is imminent, inhalations of oxygen are to be used and atropine or strychnine employed, although tracheotomy may be necessary.

Chlorate of potassium must never be given internally, as the kidneys are already severely inflamed, and this drug is not only useless when so given but in addition a renal irritant.

CROUP, SPASMODIC.

As this is a spasm of the glottis depending for its causation upon catarrh of the mucous membrane of the larynx, and as it is due most commonly to some reflex irritation, such as dentition, indigestible food, or sudden atmospheric changes, the treatment is both prophylactic and curative. Prophylaxis consists in the avoidance of cold, the use of a simple diet, particularly at the evening meal, the rendering of the air of the bedroom moist by means of steam, or at least by the avoidance of dust-laden, furnace-heated air, and by the removal of dental irritation, and nasal hypertrophies, which make the child a "mouth-breather." Small doses of the bromides, chloral, belladonna, and of opium, may be resorted to at bedtime. When the attack is present, a cold cloth should be wrapped about the neck and the child placed at once in a hot bath, the air of the room being moistened by the steam escaping from a kettle of boiling water. If the paroxysm is very severe a few whiffs of amyl nitrite may be employed or antimony may be used in sufficient dose to cause vomiting.

The drugs first named do good by decreasing reflex excitability, while the emetics relax the spasm indirectly by the nausea and depression which they produce.

CYSTITIS, ACUTE.

If, by reason of injury, the introduction of foreign bodies, such as dirty catheters, the presence of gonorrhœa or other poison, an acute inflammation of the bladder ensues, it is always accompanied by a sensation of weight and vesical fulness, by pain, tenesmus, and inability to restrain the urine. Sometimes the reverse may be true, and retention of the urine is present.

If the general system responds to the local inflammation, as is evidenced by increased arterial excitement and fever, aconite, in full doses of the tincture, should be used, and it may be combined with small amounts of sweet spirit of nitre and citrate of potassium, as follows:

℞.—Tinct. aconiti . . . . fʒj.
Spirit. æther. nitrosi . . . . f℥j.
Liq. potas. citratis . . . . . q. s. f℥vj.
M.—S. Dessertspoonful every four hours until all fever ceases and the pulse is quiet.

At the same time, a hot compress should be applied over the bladder, but it should not contain turpentine or any irritant substance which may be absorbed from the skin and when eliminated by the kidneys irritate the bladder walls. In some cases belladonna may be used with or without aconite in the dose of 5 to 10 drops of the tincture three times a day, and this drug is particularly serviceable in the cystitis due to cold; 5 drops of liquor potassa every four hours may be substituted for the citrate of potassium, or the acetate of potassium may be used. If there is much pain and bearing down, an enema of

30 drops of laudanum in 2 ounces of starch-water may be employed, or the opium may be given in suppository.

Sometimes a belladonna suppository is of more service, and an iodoform suppository will often relieve the pain by its local anæsthetic effects. Hot enemata, without any drugs, are often valuable as a means of relief, and a hot sitz bath is very efficacious. Cannabis indica, if an active preparation can be had, is better than opium to relieve the pain, since it seems particularly to affect the bladder. The other curative measures are hygienic, and consist in the maintenence of the recumbent posture, absolute physical and mental rest, the avoidance of all foods which are stimulating, as rare meats and highly seasoned dishes, and abstinence from all varieties of alcoholic beverages.

Laxatives are to be employed with persistence if the bowels are confined, and salines in the early stages are generally better than vegetable purges.

Quinine should not be used for the fever, as it is contra-indicated, owing to its irritant effects upon the bladder.

CYSTITIS, CHRONIC.

The treatment of chronic cystitis is entirely different from that of the acute form, and consists in the use of remedies which will stimulate the diseased mucous membrane, cause a normal secretion of mucus, and so influence the urine that the mucus already formed will be passed out and the fluid rendered alkaline or acid, as may be desired. When mucus is persistent in large amount the urine should be rendered alkaline by the use of liquor potassa, or the citrate, acetate, or bicarbonate of potassium. The bitartrate of potassium is eliminated as the bitartrate of potassium, and, as it is acid, cannot be used. The purpose of acidifying the urine lies in the necessity of dissolving the phosphates and preventing deposits in the bladder and elsewhere. The two best drugs for this purpose are boracic acid, in the dose of 5 to 10 grains, and benzoic acid, in the same amount. Both of these may be given in pill form, made by adding a little glycerin. The rule may be laid down that, if the urine is high colored and is strongly acid, alkalies are useful; whereas if it is clear, but loaded with phosphates, the acids named should be employed.

One of the best measures in chronic cystitis is to wash out the bladder daily, by irrigation, with warm water, or water containing bichloride of mercury in the proportion of 1 to 10,000, as this washes away all mucus and uric-acid deposits, and prevents irritation. Solutions of nitrate of silver have been used with great success where the discharge is muco-purulent, and Thompson recommends the use of a solution of the strength of 1 grain to 4 ounces of water, gradually increased to 2 grains to the ounce. Others, such as Gardner, Richardson, and Potter, recommend the use of stronger solutions, 5 grains to the ounce of water, claiming that while they may produce serious effects they are very efficacious in obstinate cases. The physician should have at hand a solution of common salt, which he should inject into the bladder at once if the action is too painful or excessive. This treatment is only suited to the most chronic cases.

The remaining remedies which are employed in chronic cystitis are those which are directed to the improvement of the mucus membrane of the bladder, and consist in buchu in the form of the fluid extract in the dose of ½ to 1 drachm, well diluted, arbutin or ursin, 3 to 5 grains, or the fluid extract of uva ursi, dose 30 drops to a drachm. All of these are better fitted for the treatment of subacute than chronic cystitis, as they are not sufficiently active for the chronic forms

In cystitis of an advanced type, with great vesical atony, strychnine is of service, and drop doses of tincture of cantharides do great good. Turpentine may also be used with advantage in 5 to 20 drop doses, as may also the oils of eucalyptus, sandalwood, cubebs, and copaiba.

DIABETES INSIPIDUS.

In diabetes insipidus the condition exists simply as a profuse urinary flow dependent upon some disorder of the innervation of the kidney, or upon atony or relaxation of this organ. The treatment consists in the use of astringents and tonics, and in some cases in the employment of opium or belladonna, particularly if the over-secretion rests upon nervous irritability. Gallic acid may be used in 20 grain powders three times a day, and the fluid extract or wine of ergot is often of service given in the dose of 30 drops to a drachm of the former or a wineglassful of the latter. As tonics the sulphate of iron and strychnine are indicated.

DIABETES MELLITUS.

The treatment of diabetes mellitus is dietetic and medicinal. The diet list should be made largely of meat, particularly if some fat be attached to it, as the fat takes the place of starch in the body. The avoidance of starches of all kinds, and the use of dry wines or those containing little or no sugar is to be insisted upon, and beers and malt liquors must be forbidden. According to some authorities, the patient should be put to bed and put on a purely milk diet, generally of skimmed milk, although buttermilk is better than any other form, owing to its lactic acid and lack of sugar. Koumyss for the same reason is very valuable. The chief aim of the patient must be to avoid all substances which can be readily converted into sugar by the organism.

The following list of foods may be taken, and the second list forbidden.[1]

Meats of all kind except liver, eggs, fish, cheese, butter and cream. Oyster plant, asparagus (?), tomatoes, almonds, pecan nuts, butternuts, walnuts and cocoanuts. String-beans, beet *tops*, radishes, mushrooms, lettuce and water-cress, cauliflower, spinach and onions. Celery and cucumbers may also be permitted.

Of the foods to be avoided we have all forms of sugar, all forms of starch, such as ordinary flour, cornmeal, arrowroot, sago, tapioca, oat-meal, barley, carrots, beets, parsnips, pie plant, peas and beans, chestnuts and most of the fresh fruits, cider, beers, champagne, sweet wines and honey.

The treatment of diabetes by drugs is varied by the condition of the patient, the cause of his disease, and the quantity of sugar in the urine. While the drugs most commonly employed are used in many instances without any knowledge of how they act, and have each of them a set of warm supporters among prominent authorities, much of the treatment must depend upon whether or not a rheumatic or gouty taint is the cause of the trouble or whether it is due to high living, little exercise, and a plethoric, congested, overloaded system. In the first class of cases iodide of potassium and the salicylates will be most serviceable; in the second class, a restricted diet, moderate exercise, and purgation to relieve engorgement of the hepatic artery and veins may be needed. In the cases of gouty diabetes, where relief does not follow the use of the iodides and colchicum, resort must be had to arsenic and lithium citrate or carbonate, a combination peculiarly adapted to such a condition according to several authorities. Indeed arsenic is a sheet-anchor with many practitioners in all forms of diabetes, and should be given in fairly large, constantly repeated doses for a long time. A very much larger body of medical men believe in opium, or one of its alkaloids, codeine. The former is used in the dose of $\frac{1}{4}$ to $\frac{1}{2}$ grain three times a day; the latter 1 to 5 grs. t. d. The chloride of gold and sodium ($\frac{1}{10}$ grain) has been highly recommended by Bartholow, and ergot by Wood and DaCosta. In cases depending upon rheumatism the use of salicylic acid is often of great value, the dose being 10 to 15 grains three times a day.

The excessive thirst of diabetics can be best allayed by the use of acidulated water or alkaline waters, containing non-purgative salts. It is useless to cut off the water-supply to the production of great suffering, but the patient should use moderation in drinking as far as possible.

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[1] It is worthy of note that certain persons may have a slight glycosuria without serious injury, who waste under a limited diet, requiring ordinary fare to supply the body plus the diabetic drain.

The wasting coming on in diabetics is to be treated by careful diet, rest, and the supply of all the food which the patient can digest. In many instances the amount of aliment ingested is extraordinarily large, while in others digestion is so impaired that food cannot be taken.

If cachexia comes on, iron, strychnine, bitter tonics, the lacto-phosphates of lime and sodium and astringents are to be used to support the circulatory and nervous systems. Tea and coffee and all forms of foods needing sweetening, may be rendered palatable by the use of saccharin or of glycerin. The former passes through the body unchanged, the latter increases the glycogen in the liver but checks the formation of sugar (Ransom).

Unfortunately we do not know the innermost causes of diabetes, nor the manner in which the glycosuria is brought about, and in consequence cannot explain the manner in which opium, codeine, or other drugs produce relief.

DIARRHŒA AND DYSENTERY.

Diarrhœa is a term loosely applied, with perfect correctness, to all forms of intestinal disturbance accompanied by the passage of liquid stools, and its meaning "to run through" expresses the state it represents. (See Cholera Morbus.)

The treatment of each form of diarrhœa depends upon its cause, and no case can be intelligently treated in which the physician fails to recognize this aspect of the case. Diarrhœa is but a symptom, not a disease, and must be regarded solely as an evidence of intestinal disorder.

While the same drugs are prescribed in many forms of the trouble we may divide these conditions into four classes as follows: (*a*) Those in which the laxity is due to a catarrh, acute or chronic, of the intestinal mucous membranes, causing the passages to contain mucus. (*b*) Those where, owing to disordered innervation, a profuse outpouring of liquid takes place from the bloodvessels into the intestinal lumen. (*c*) Those in which, owing to disease, the glands fail to prepare the food properly; and finally (*d*) those cases where ulceration causes irritation and bloody purging.

The treatment of the catarrhal form first named consists primarily in the regulation of the diet, which should be made up chiefly of milk, boiled or predigested, and in the administration of castor oil or other mild purge to sweep out fermentating mucus. Enough laudanum should accompany this oil to prevent griping, and it is well to add bicarbonate of sodium, grains 20 to 30, to the dose, both to aid the action of the oil and to render the bowel alkaline in reaction (normal) in place of acid, as caused by the fermentation abnormally present. A mustard plaster or other counter-irritant should be applied to the abdomen. Often in the milder forms of mucous diarrhœa this is all that is needed, but more frequently it must be followed by the use of tonics and astringents, such as nitrate of silver and hyoscyamus in the following pill:

℞.—Argenti nitratis. . . . . gr. ij.
Ext. hyoscyam. . . . . gr. v.

M. ft. in pil. No. x.—S. One t. d.

Or,

℞.—Plumbi acetat. . . . . gr. ij.
Ext. opii . . . . gr. ij.

M. ft. in pil. No. x.—S. One t. d.

If these stop the diarrhœa and there are still seems to be a tendency for it to return, or atony is present, we should use a pill containing the extract of chiretta, or nitro-muriatic acid, or better still, nitric acid and cardamoms.

℞.—Acid. nitric. dil. . . . . fʒj.
Tr. cardomomi comp. . . . . f℥ij.
Tr. gentian. comp. . . . . . . q. s. f℥ij.

M.—S. Dessertspoonful every four hours.

If the catarrhal state is persistent no remedy compares to the chloride of ammonium, dose 5 grains every four hours in liquorice and water.

If the pills named do not control the diarrhœa the following may be used:

℞.—Acid. sulph. aromat. . . . . fʒjss.
Spt. chloroformi . . . . f℥ij.
Tr. opii camphorat . . . . f℥ij.
Syr. zingiberis . . . . q. s. f℥iv.

M —S. Dessertspoonful every two hours.

Or,

℞.—Tr. kino . . . . f℥j.
Tr. catechu comp. . . . . f℥j.
Mistura cretæ . . . . f℥iij.
Aq. cinnamomi . . . . q. s. f℥vi.

M.—S. Shake well before using. Tablespoonful every three hours.

In the second form of diarrhœa named, those in which serous or watery diarrhœa is present, the treatment is radically different. In these the bloodvessels of the gut are relaxed and leaking, and must be contracted and made water-tight. This dilatation may result from fear, "nervous diarrhœa," from exposure to cold, or from exhaustion, extreme heat, and irritant foods. If from irritant foods they are generally swept out in the first flush of liquid.

The measures to be adopted consist in those directed to the contraction of the dilated and relaxed bloodvessels, and the restoration of the proper nerve-supply to the parts.

As the splanchnic nerves are the vaso-motor nerves of the intestine as well as the inhibitory nerves of peristalsis, it is evident that we must use drugs which will cause stimulation of these fibres, and the chief of these is found to be opium, which diminishes intestinal peristalsis and secretion by just such an influence. In the same way small doses of volatile oils are of service, and camphor and spirits of chloroform may be used. As there is relaxation, astringents are indicated, and as sulphuric acid is not only astringent but eliminated by the lower bowel, it is peculiarly serviceable. We find, therefore, that the following prescription fulfils every indication.

℞.—Acid. sulph. aromat.		f℥ss.
Ol. cajuput.		gtt. xl.
Ext. hæmatoxylon		ʒij.
Spt. chloroformi.		f℥j.
Syr. zingiberis	q. s.	f℥iij.

M.—S. Teaspoonful in water every three hours.

If desired, kino or catechu may be used in lieu of the hæmatoxylon, or oil of cloves substituted for that of cajuput. Camphor or paregoric may also supplant these drugs.

In some instances these attacks appear to depend upon hepatic disorder, and the only cure, aside from partial relief, is to be obtained by the use of mercury with chalk or calomel given in $\frac{1}{6}$ to $\frac{1}{2}$ grain doses.

Wood has highly recommended the use of bismuth containing a drop or two of carbolic acid.

The third class of cases seems in many instances to lie between those just spoken of and those in which the writer has placed them; they occur chiefly in children and consist in the fœtid "mousy" smelling stools of summer diarrhœa, with green spinach-like masses or distinct lientery.

They may be due to deficient glandular action in any part of the alimentary canal, and are often cured by the use of pepsin and hydrochloric acid to perfect the gastric processes. In other instances the duodenum is at fault and should be excited by small doses of nitro-muriatic acid, or by podophyllin in the dose of $\frac{1}{40}$ to $\frac{1}{50}$ of a grain with a little milk sugar, or given in solution. Similarly ipecac in powdered form may be used in the dose of $\frac{1}{4}$ to $\frac{1}{2}$ a grain three times a day. As the child is often a sufferer from rickets, phosphate of sodium, lime salts, and common salt should be freely given.

For the purpose of establishing intestinal antisepsis, carbolic acid may be used, and naphthalin, thymol, and other drugs of this class have been employed, particularly salicylic acid. None of them compare with carbolic acid, however, which should be used in 1 drop doses on bismuth or in water.

Sometimes a good, brisk dose of calomel followed by a saline does good in these cases, if they are strong enough to permit of its use.

The regulation of the diet, which should consist in sterilized milk or koumyss, the former being predigested, is of the greatest importance, and the proportions of the milk, water, and cream should be varied until a mixture is formed which is exactly fitted to the digestion of the case. The after-treatment consists in the use of tonics and a carefully regulated diet.

The fourth type, generally known as dysentery, is due in some cases to hepatic trouble, in others in the drinking of impure water, and in the third place to exposure to heat and bad food. It is in most cases a very obstinate form of diarrhœa, requiring much skill and patience in its care. In the chronic forms deep ulcers may exist; in the milder cases a high inflammation is present.

In those cases which are due to exposure to heat and hepatic trouble there are two remedies which are far above all others in value and should always be resorted to. The first of these is ipecac, the second is calomel.

The ipecac should be used in a special manner to be effective (see Ipecac, p. 191), and the calomel should be used in full purgative amounts, but is contra-indicated if much weakness is present.

If the passages are slimy and bloody $\frac{1}{100}$ of a grain of bichloride of mercury every hour or two is of service, or if much blood is present injections of the distilled extract of hamamelis are of value. In some forms of dysentery due to acute inflammation large enemata of iced water are of the greatest value. The water should be ice-cold and at least a quart injected by hydrostatic pressure. This method can only be used in strong persons.

If the ulcers are very old and chronic, nitrate of silver injections may be employed in large bulk of the strength of 10 to 20 grains to the pint of water, a salt solution being at hand for its destruction if too great an action ensues.

DROPSY.

Dropsy is to be regarded as a symptom, not a disease in itself, and it may arise from many causes, such as cardiac, pulmonary or renal lesions, or depend upon obstruction to the normal flow of the blood and lymph through the tissues. Its existence is dependent upon so many causes of a still more indirect nature that it is almost impossible to notice all of them, but the following consideration of the subject will at least make clear some of the reasons for its occurrence and indicate the means which are to be taken for its relief.

At the very start we are confronted by facts which seem paradoxical, but which are in reality quite reconcilable. These are that low arterial pressure predisposes to dropsy and that high venous pressure does likewise, or, in other words, that the cause of exudation on one side of the circulation is its prevention on the other.

The explanation of these statements lies in a thorough understanding of the physics of the circulatory system and its anatomical structure. It will be remembered that dropsical exudation takes place from the capillaries, and that the integrity of the walls of the bloodvessels and lymphatics depends upon normal nutrition or, in other words, from a proper blood supply. As a consequence dropsy may be due to poorly nourished vessels as much as to any other cause. Further than this a watery state of the blood permits abnormal exudation.

The force exercised upon the column of blood as it is driven out by the heart into the aorta may be considered as the chief support of the capillary circulation, so that if the heart be weak the pressure falls in the arteries and the rapidity of flow is decreased in the capillaries in consequence, while, on the other hand, an increased cardiac activity hastens the capillary circulation. As the arterial pressure and force depend not only upon the heart force but also upon the tonicity of the arteries which carry the stream, it becomes evident that dilated arteries must lower blood pressure even if the heart be strong, although practically the heart and vaso-motor system generally fail or increase in tone together. We find, therefore, that a weak heart or a relaxed artery both tend to cause stagnation of the blood in the capillaries, and having found that such stagnation is productive of exudation it is not hard to discover why low arterial pressure is a cause of dropsy.

Having shown this to be true, let us turn to an explanation of the fact that a high pressure in the veins is productive of the same changes.

Here the normal pressure is almost nothing, being much less than in the arteries, and considerably less than in the capillaries. The result of this is, that in health the blood flows rapidly from the high pressure of the artery to the low pressure of the vein, and passes through the small veins under a gradually decreasing pressure until it reaches the heart. Any obstruction to this venous flow must increase the venous pressure, and the venous pressure being increased the rapidity of flow through the capillaries must be decreased. The whole subject may be made more clear by the following example:

Supposing that two iron tubes are connected at one end by several lines of rubber tubes (the capillaries), and that water is flowing into the first tube, or the artery, under a pressure which is represented by the figure 100, while the resistance to the flow in the second tube, the vein, is represented by the figure 0. It at once becomes evident that the rapidity of the flow through the connecting rubber tubes will be very great, whereas, if the pressure in the first or arterial tube is decreased to 50 the rapidity is decreased one-half, or if the pressure in the second tube be increased to 50 instead of remaining at 0 the same changes will occur, in either instance capillary flow is lessened and exudation is caused. This is the pathology of dropsy, and having understood it, let us proceed to discover the causes of dropsy in various diseases.

In cardiac disease it is due to a weak heart being unable to supply the arteries with enough blood to maintain the normal pressure, or to a damming up of blood in the venous system as the result of the imperfect emptying of the cardiac cavities. In the first instance low arterial pressure produces dropsy; in the second, high venous pressure has a similar effect.[1]

In renal troubles the dropsy depends more upon the lack of proper nutritive processes in the capillary walls and upon changes in the blood pressure than upon other causes. If the kidney is diseased it may not be able to eliminate the proper quantity of liquids, which accumulate and finally escape into the tissues, while the same failure in renal function causes disease of the blood-paths themselves, and often produces cardiac complications.

Hepatic troubles cause dropsy by producing pressure upon the large bloodvessels going to the liver, and in consequence, the exudation is generally confined to the lower limbs and abdomen. If the hepatic trouble be severe, some failure in the nutrition of the bloodvessels and changes in the quality of the blood may ensue.

Pulmonary disease rarely causes dropsy unless the venous pressure is greatly increased and productive of cardiac dilatation, or, as in phthisis, where the changes in the nutrition of the body involve the bloodvessel walls and the blood.

Having spoken of these causes of dropsy it remains to consider its treatment, which may be divided into two parts, namely, that directed to its removal when once the liquid is poured out and its relief or cure by direct attention to its causes. The means for the removal of the fluid are suitable in all cases, be the cause what it may, unless the dropsy be of renal origin. Whenever an accumulation of liquid takes place in the tissues, drugs or measures must be resorted to which will cause the emunctories of the body to throw it off. In ascites, in particular, we may employ elaterium in the dose of $\frac{1}{6}$ of a grain, or elaterin in the dose of $\frac{1}{20}$ of a grain placed in the mouth and washed down by a little water, or if this is not used then compound jalap powder may be resorted to and given in the dose of 20 to 30 grains, and to it may be added, to increase its efficiency, 10 grains more of birtartrate of potassium than the officinal powder contains. These two remedies are particularly serviceable in renal dropsies since the elaterium is supposed to aid in the elimination of urea by the bowel, while the cream of tartar in the jalap powder increases the action of the kidneys.

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[1] For an explanation of the changes in the action of the muscle, valves, and cardiac action in heart disease, see Heart Disease.

The cream of tartar is not to be used in acute nephritis.

Compound extract of colocynth may be employed in the dose of 2 to 6 grains, according to the state and idiosyncrasy of the patient.

All these remedies relieve dropsy by causing so great an outpouring of liquid from the bloodvessels of the body that the liquids in the tissues are taken up by the depleted bloodvessels to replace the loss through the action of the purgative.

In other words, these purgatives render the alkalinity of the blood greater by concentration, and absorption of fluid occurs by reason of the following physiological and physical facts.

As is well known to every physiologist, the passage of a salt solution through a bloodvessel of less than seven-tenths of one per cent. causes an abstraction of salts by the circulatory fluid from the tissues, in order that the amount of salts in the vessels and tissues may be identical. At the same time the tissues become infiltrated with liquid. On the other hand, if the solution be stronger than the normal, the liquid leaves the tissues to enter the vessels and the tissues in consequence shrink.

When salines are given to relieve dropsy they must be administered in concentrated solution and on an empty stomach, total abstinence from the drinking of water being insisted upon until they have fully acted for the reasons given in the last paragraph. For this reason they should be given an hour or so before breakfast. If these directions are not followed this treatment is useless.

The other means which we possess for the removal of dropsy are by way of the kidneys and skin. If the kidneys are hopelessly diseased this pathway is almost useless, but if they are only passive, or partly inactive, diuretics may be used to stimulate their secreting structure and to increase the leakage of liquid through them by increasing blood pressure.

Often the kidney will be found inactive because, owing to its congestion from cardiac trouble, it cannot act. Under these circumstances digitalis, in 5 or 10 drop doses of the tincture, given three times a day, will be of value, and its efficacy will be increased by the addition of 1 drop of the tincture of cantharides *if the renal lesion is exceedingly chronic or mere torpidity exists.* Digitalis and squill, in pill form, as follows, may be used.

℞.—Pulv. digital. fol. . . . . gr. xx.
Pulv. scillæ . . . . gr. xx.
M. ft. in pil. No. xx.—S. One every five hours.

Or digitalis and calomel may be employed in pill form in renal and cardiac dropsies.

Caffeine is also a useful diuretic, particularly in torpidity of the kidney, as it stimulates the secretory epithelium, thus eliminating urea and other effete matters, and increases the passage of liquids by increased blood pressure.

That a large amount of liquid may be gotten rid of through the skin under the influence of heat is well known. (See Heat.) In addition to external heat we may use pilocarpine by the mouth or hypodermically in localized dropsies, to produce absorption of liquid by sweating. No drug should ever be given hypodermically in dropsy of a general character as it will not be absorbed from the water-soaked tissues with any rapidity if at all.

The muriate of pilocarpine may be given in the dose of $\frac{1}{6}$ to $\frac{1}{4}$ grain by the mouth, or $\frac{1}{8}$ to $\frac{1}{6}$ by the needle. This method of relieving dropsy is often very exhausting, and should not be used if cardiac depression or weakness is present.

If dropsy depends upon deficient cardiac action digitalis will nearly always do good. (See Digitalis, page 148.) Or, if this is not used, citrate of caffeine will be found of service.

Remembering that the dropsy is the result of failure on the part of the heart to do its work we must use proper exercise, food, stimulants, and rest, combined with fresh air and avoidance of mental worry.

An infusion of scoparius, 1 ounce of the tops to a pint of water, taken in twenty-four hours, may be of service, and strophanthus, sparteine, and adonidin may all be used if any one of the drugs commonly employed fail.

In hepatic cirrhosis, and in localized effusions of a chronic type, the best treatment for the removal of the liquid is the iodide of potassium, or tapping with a trocar and canula attached to an aspirating flask.

Where the tenseness of the skin in the lower extremities causes danger of local sloughs some authors recommend small punctures for the escape of the liquid, the limbs being incased in sterilized absorbent cotton to absorb the liquid.

Comparatively recently the use of saline purgatives (Epsom salts) has been largely resorted to for the relief of dropsy, owing to the study of Hay and others, who found that these drugs act by abstraction of liquid from the tissues, when in concentrated form, as we have explained when speaking of the manner in which absorption takes place in dropsy. The manner of their administration must be careful. The solution of the sulphate of magnesium should be almost saturated and the dose be given on an empty stomach, preferably before breakfast.

DYSENTERY.

(See Diarrhœa.)

DYSMENORRHŒA.

Dysmenorrhœa rests upon so many conditions that the treatment of one of its forms in one instance seldom reaches success in the next case. This is not the place for a consideration of the surgical measures adopted for its cure, only the medical treatment being spoken of.

Where dysmenorrhœa results from the taking of a cold, and is accompanied by uterine congestion and irrritability, the following measures are particularly valuable and may do good in many other instances. The patient may take a hot sitz-bath and immediately get into bed as soon as the buttocks are dried, being well covered while in the tub, and afterward, by a blanket. A turpentine stupe is now to be used (see Turpentine), and 10 grains of Dover's powder to be administered, unless some idiosyncrasy toward opium is known to exist, when half or one-fourth of this amount may be employed. Often when the attack is accompanied by constipation, a purgative dose of Epsom salts or aloes is of service in these congestive forms.

If the pain be persistently severe a belladonna suppository, of ½ grain of the extract, may be inserted into the rectum, or in some cases belladonna ointment smeared over the os uteri will be found of service. The latter method is generally impractical and is rarely resorted to. Very commonly belladonna tincture, by the mouth, is of service in relaxing the spasm of the cervix and of the uterine fundus.

Some practitioners resort to the use of opium at each epoch, and keep the patient partially narcotized until menstruation is passed. This is unjustifiable and born of ignorance and bad practice, since the physician is simply dodging the trouble and predisposing the patient to future attacks, by reason of the constipation and resulting pelvic disturbances sure to appear after the employment of opiates.

When the dysmenorrhœa is due to obstruction of the cervical canal by organic changes or flexions, these conditions must of course be relieved before cure can be expected, and the medical treatment can only be directed to alleviation of the pain. Divulsions or slow or rapid cervical dilatation should be carried out through the use of instruments or tents.

In neuralgic dysmenorrhœa dependent rather upon nervous disorder accompanying menstruation, than upon menstruation itself, measures directed to the improvement of the nervous system and the nutrition of the patient are necessary. These cases generally occur in nervous, anæmic women, run down by excessive dancing or other gaiety, or by the care and bearing of a large family of children.

A course of strychnine or quinine in small dose and iron is often beneficial to these cases, and horseback exercise, between the periods, out-of-door life and avoidance of excessive dancing and exhausting exercise are to be ordered.

Sometimes bathing the loins with alternate dashes of hot and cold water may do good in atonic patients. Cannabis indica and gelsemium, are often of great service, both as cures and alleviators of the pain, and antipyrine, acetanilide, and similar drugs may be resorted to while the attack lasts if it be neuralgic.

DYSPEPSIA.

(See Indigestion.)

DYSPNŒA.

Shortness of breath or dyspnœa arises from cardiac weakness or palpitation, from the accumulation of fluids in the chest, the involvement of the lungs by any diseased process, in such a way that respiration becomes impaired, or indigestion, or finally by pressure upon the chest-walls by tumors and growths.

Each of these states must be removed to effect a cure, but it is only of the relief of the symptoms that we will here speak.

In old persons who suffer from dyspnœa, the result of bronchorrhœa, where a large amount of liquid fills the bronchial tubes, and shortness of breath follows exertion, strychnine is the best remedy that we have. Its value depends upon its powerful influence over the respiratory centres, on which it acts as a stimulant, and as these cases also very commonly have dilatation of the right side of heart, with consequent cardiac enfeeblement, strychnine is of additional service through its influence upon the circulation. These cases are not to be given opium, or its alkaloids, or any sedative drugs, as they give temporary relief from cough, but only serve to depress the respiratory apparatus and cause an accumulation of liquid mucus in the chest, as a result of the prevention of expectoration. The cases in which opium or morphine do good are those in which through nervousness or functional nervous disorder the respiratory cycle is imperfect, and, above all, in those instances where dyspnœa occurs as the result of cardiac disease. In these cases the attacks of oppression and suffocation can often be entirely set aside, by the use of ⅛ to ¼ grain of morphine every night, or night and morning. If these doses fail, larger ones may be cautiously used. Hyoscine instead of giving sleep, nearly always makes these cases worse.

Sometimes a little carbonate of ammonium is useful as a respiratory and cardiac stimulant in cases of dyspnœa.

Dry cupping applied over the back of the chest may also be serviceable where shortness of breath from cardiac or pulmonary trouble is present.

In the dyspnœa due to emphysema and pulmonary inflammation of a chronic type, as is represented by those persons who take cold on the slightest cause, particularly after attacks of asthma, arsenic is useful if continuously employed.

ECZEMA.

This is probably the most common form of skin disease which the physician is called upon to treat, with the exception of acne.

Dermatologists divide it into many forms and stages, but in this place a consideration of its forms is out of place and the treatment for its stages is proper.

At first it may be stated that the treatment is a quadruple one, namely, dietetic, hygienic, external, and internal.

In regard to diet the patient should be told to avoid salt foods, such as salt fish or pork, and corned beef; greasy foods, such as bacon and fried dishes, pastry and cheese. Only moderate amounts of wine and beer can be taken, and viands difficult of digestion are to be striken off the bill of fare.

In the way of hygienic measures, fresh air, the avoidance of sedentary habits, horseback exercise, or walking is to be recommended. External treatment is the most important of the two measures in which drugs are employed, and its course is perhaps best described by taking a case of ordinary eczema, as an example, and treating it through its entire course.

In the early stages of an acute eczema, when the process is very active and the erythematous reddening of the beginning of the disease is merging into the formation of vesicles or pustules, with the formation of large scabs, no application is better than oxide of zinc ointment thoroughly applied night and morning. If the eczema be situated upon the scalp the hair must be invariably clipped short or shaved off in such a way as to prevent the glueing of the hair into a mat by means of the discharge. The ointment may be smeared over the part or applied on a piece of lint in a thick layer. Nearly always the ointment should be used in conjunction with black wash (calomel 1 drachm, lime water 1 pint), which should be applied twice a day just before the zinc ointment is resorted to, by means of a swab or soap and allowed to dry. In other cases the powdered oxide of zinc is dusted over the part if the discharge is very watery and profuse, or the following ointment, recommended by McCall Anderson, is very efficacious:

℞.—Bismuth. oxidi	℥j.
Acid. oleic. pur.	ʒviij.
Ceræ albæ	ʒiij.
Vaselin	ʒix.
Olei rosæ	♏v.

M. ft. in ung.—S. Apply to the part affected.

As the quantities of this prescription are large they may be reduced one-half for use in limited eczema.

Where the proliferation of cells and the secretion are very profuse it may become necessary to remove the crusts before the local remedies can reach the skin, and for this purpose poultices may be used; or, if the disease be on the face, the parts should be anointed with olive oil, containing 1 or 2 drops of carbolic acid to the ounce, to soften the crusts which are readily removed in a half hour by the use of a little castile soap and water. The soap is not to be used if the inflammatory action is very angry looking. Whenever itching is an annoying factor the parts should be protected by lint smeared with ointment to prevent itching, and a little carbolic acid employed in each application for its local anæsthetic effect. English and American dermatologists use what is known as liquor carbonis detergens very largely in the acute stages of eczema as well as in other skin diseases. It should not be used pure, but diluted in such a way that for each 4 ounces of water 2 drachms of the pure liquor are present. Liquor carbonis detergens is made by taking 9 ounces of tincture of soap bark (quillaia bark) and 4 ounces of coal tar, mixing and allowing them to digest for eight days, after which the mixture is filtered and used.

When the disease has passed from the acute, active inflammation of the first stage to the subacute form of the second stage of its existence applications of a mildly stimulant character are necessary. Before this the physician has endeavored to soothe the parts; now they must be excited to normal activity. For this purpose resorcin in the proportion of 2 to 30 grains to the ounce, according to the severity and induration of the lesion in the skin should be used. Stelwagon recommends the following:

℞.—Unguent. picis. liq. . . . . . . ʒj.
Unguent. zinci oxidi . . . . . . ʒvij.

M.—S. Apply to the parts.

Where the disease is absolutely chronic and very persistent, but sluggish or atonic in its course, still more powerful remedies are necessary, such as salicylic acid, tar, or tincture of green soap used with hot water until the skin beneath is bared, dressing this by means of zinc ointment or resorcin ointment, 2 to 10 grains to the ounce, spread on a cloth. The salicylic acid should be used in the proportion of 30 to 60 grains to the ounce of lard, while the tar is used in the form of the pure officinal tar ointment.

Internal treatment is directed to the cure of any disordered function which is present, such as dyspepsia (see Indigestion), hepatic torpor, general debility, anæmia, scrofulosis, inanition, constipation, gouty diathesis, or renal insufficiency. The gastric disorder is to be treated by the use of hydrochloric acid and pepsin; the hepatic torpor by mercury, podophyllin, or, better still, nitro-hydrochloric acid, of a dark-red color, not orange color; the debility by tonics, such as cinchona, cod-liver oil, strychnine, and bitters; the anæmia by iron, and, if scrofulosis exists, by the syrup of the iodide of iron. Constipation is to be cured by the use of proper foods and laxatives, and the gouty tendency counteracted by the use of lithium citrate and colchicum, or potassium iodide. If the kidneys are at fault the diuretic potassium salts, such as the citrate, are indicated. Arsenic is never to be used, except in a few instances where the skin is very dry, and where, by improving digestion and its alterative power, it does good in the chronic forms or those depending upon some atonic state of the trophic nerves of the skin.

EMISSIONS.

Seminal emissions occur as the result of sexual abuse, whereby a condition of hyper-excitation of the nervous cells in the spinal cord and the nerves of the genitalia is developed, or they are due to peripheral or centric irritations, which reflexly irritate the genitalia or their nerves, and to a number of other similar causes. These emissions also occur with some periodicity in normal males, who are continent and chaste, and, under these circumstances, are not to be interfered with by treatment, unless they become excessive.

The former types are, however, proper for medical treatment, and their cure consists in the avoidance of unchaste literature and thoughts during the waking hours, and the use of such spinal and cerebral sedatives that the centres governing the ejaculations of semen may be quieted, and so quiet a sleep produced that lascivious dreams are avoided. The patient should sleep on a hard hair mattress, and not be too heavily covered, and should avoid sleeping on his back, as this causes an undue blood-supply to the spinal centres, and consequent stimulation and ejaculations. Sometimes hard bodies, such as spools, are tied around the loins so that any change of position will cause so much discomfort that the patient awakes and turns on his side. The drugs to be used are bromide of potassium or sodium in 20 grain doses, at bed-time, or chloral may be taken in the same amount. Hyoscine has been most enthusiastically recommended by Wood in the dose of $\frac{1}{100}$ grain. Sometimes a warm sitz bath or general bath, before going to bed, is of service.

In the cases of emissions which come on as the result of continence, and which become excessive, these remedies are to be tried, but really do not effect any permanent cure unless used until sexual power is seriously depressed, and it has been the custom of many physicians to recommend " marriage," which the patient may interpret in its legitimate light or not, as he pleases.

It is worthy of note that all irritations of the urinary bladder and other parts of the genito-urinary system should be removed, and it is often of value to administer citrate of potassium in 20 grain doses, in water, three times a day, to render the urine non-irritating and alkaline. Stimulating foods and drinks are to be interdicted, and condiments, such as pepper and mustard, avoided.

Sometimes, where the condition rests on *genital atony*, strychnine and arsenic are of very great service if given in full dose.

ENDOCARDITIS.

Endocarditis occurs sometimes as a single manifestation of disease; sometimes as a symptom, with many others, of some general tendency, produced by a diathesis, such as gout and rheumatism, or syphilis. Further than this, it may be acute, subacute, or chronic, and each one of its forms must be differently treated.

It is hardly necessary to state that any diathetic taint should be treated by anti-rheumatic or anti-lithic remedies, or the iodides. The iodides are not, however, indicated if any rapid changes of a degenerative type are at work. In acute sthenic endocarditis, associated with great vascular disturbance and much cardiac embarrassment, or irregularity, there is no remedy in the early stages half so good as full doses of tincture of aconite, 2 to 3 drops, given every hour until the physiological symptoms of its influence are felt, or, in its place, with equal efficacy, may be employed the tincture of veratrum viride (2 to 3 drops). At the same time calomel and opium may be used; the calomel, for its antiphlogistic influence, and the opium, to control the purgative tendencies of the mercurial. Thus we may use $\frac{1}{4}$ grain of calomel every two hours and $\frac{1}{10}$ of morphine. Leeches should be placed over the præcordium in goodly number, and if these are not obtainable wet cups are to be employed. This depletion is only of service when the disease is seen early enough to make its abortion possible. As the disease progresses, if the physician fails to stop it, it will be found that the heart becomes somewhat labored, irregular, and weak, and that its rhythm is seriously interfered with. At this time digitalis is of use in stimulating the depressed cardiac muscle and increasing its reflex activity and also steadies it through the pneumogastric irritation which it sets up. Aconite and other depressants are contra-indicated at this time. Absolute rest is to be insisted upon, and it is recommended, in these cases where deposits of a calcareous nature are likely to occur in the valve, that the citrate or acetate of potassium be given, or that citrate of lithium be employed. If the disease becomes purulent, or rather ulcerative, supportive treatment, consisting chiefly in the use of good food, and the administration of the tincture of the chloride of iron is of great value if the dose be large.

EPILEPSY.

The disease known as epilepsy is probably the most disheartening condition as to treatment that the physician has to deal with, since it often resists the influences of all the standard remedies, and drives the practitioner from drug to drug in the hope of finding one which

If the attacks have a distinct periodicity, or can be foretold, for as much as two hours beforehand, the remedy may only be taken in a large dose at this time, and but a few grains given in the intervals, and if these attacks are severe, no one should hesitate to use large doses, by the mouth, and by the rectum on the day of the attack.

A very important point to be borne in mind, is that the drug often seems to have produced a complete cure, and this results in carelessness in the regularity of administration. The patient should be impressed by the fact that every day passed without a fit is a step forward, and that every fit carries him many steps backward. He should also be made to use the drug in moderation, for at least three years after all fits have ceased, and to watch, after that time, for the slightest sign of their return. The quantity taken each day should be gradually decreased, not suddenly stopped short.

It is true, also, that if a recurrence of the fits takes place they yield to treatment very much more slowly than before.

Before passing on to the discussion of the other bromides, and the conditions produced by the excessive use of all of them, we may place our use of these compounds in epilepsy on a scientific footing. It is now gradually recognized that the seizures known as epilepsy are cortical in origin, and there can be no doubt that the bromides act very powerfully upon the cerebrum in the higher animals, decreasing the irritability of the motor centres in these regions to a very great extent. Not only is this pointed to by a clinical fact, but the well-known researches of Albertoni seem to prove that such is their action beyond all doubt. This investigator found that the administration of a single dose of the bromide of potassium so lessened the excitability of the motor-cells in the cortex cerebri, that much stronger stimulation was necessary, in order to cause response in the limbs, than was normal, and that it was difficult to produce epileptic attacks, by means of the electrical stimulation of the areas, even when currents were used very much stronger than those which commonly produce such a result. He also found that this lessened irritability was increased still further if the drug *was given* for several *days beforehand* in such doses *as thoroughly to* impress the organism. It is therefore evident that the bromides act directly on the cortical areas, calming the tendency to explosions of nerve force.

The results of Seppilli have also confirmed those of Albertoni in every way.

An enormous amount of research has proved also that the drug may be doubly useful in reflex epilepsies, not only by its action on the motor cortex, but by its influence on the afferent portion of the nervous system.

The experiments of Eulenberg and Guttman prove that the sensory paths in the spinal cord feel more powerfully than any other portion of the body the effects of the drug; for these investigators found that if they tied the bloodvessels, supplying one limb of an animal, reflex action was abolished equally on both sides, proving that the loss of reflex action does not depend upon the action of the drug on the sensory nerve-trunks. That the loss of reflex is not due to an action on the motor portion of the cord is proved by the fact that voluntary motion is completely preserved. As these experiments have been confirmed by Lewisky, Bartholow, Purser, the author, and Laborde, there can be no doubt of their truth; and we can rest assured that not only does the drug prevent nervous disturbance in the cerebrum, but that it also prevents the peripheral irritation from travelling up to the brain, there to produce morbid excitement.

Apropos of the theory that epilepsy is due to vaso-motor disturbance, which is unfounded, it may also be added that the bromide of potassium was, and is, believed by some to effect a cure by producing a vaso-motor spasm at the base of the brain, but there is not one atom of reason in this idea, even if the disease were due to vaso-motor changes. Hammond and Amory have seen the circulation in the brain slowed by the drug, and it has been claimed by Lewisky that if the toes be cut off the blood flows more slowly from them in the poisoned animal than in the normal frog. None of these facts prove vaso-motor action, but rather that there is a lessened circulation by reason of cardiac depression produced by the potassium, which is well known to occur.

An important therapeutic point is to know how rapidly bromide of potassium is eliminated, so that we may know how frequently to give the drug.

That it is passed out with only moderate speed is certain, for Rabuteau has noted its presence in the urine one month after the last dose, and Bill had found it two weeks after the use of the drug had ceased.

Amory recovered, on the other hand, one-half the amount ingested in the first succeeding twenty-four hours, and one-third in the second twenty-four hours. It is evident, however, that it is eliminated so slowly that doses given three times a day make the patient ingest more than he passes out. That it remains long in the system is proved by the fact that after repeated doses given to a healthy man marked somnolence persists for some days.

There is one more point to which attention must be called, and that is the fact that when the bromides are taken for any length of time they produce bromism which, in its moderate or severe forms, produces a mental condition very closely allied to that seen in old, chronic epileptics. This condition of the mind should never be overlooked; and the mental changes of epilepsy are greatly increased by its constant and careless administration.

The bromide salts of iron, sodium, lithium, nickel, and ammonium have all been used in epilepsy with good results; but, except in certain instances, they fail to act as well as that of potassium, unless given in larger doses. There are several occasions in which, however, each one possesses marked advantages, and may succeed where potassium has failed. In all cases of epilepsy complicated with anæmia the bromide of iron should be employed; but where there is plethora it will generally increase the disease or do no good. Where it acts after potassium fails, the iron is of value, because of its tonic and nutritive effect. Bromide of sodium, while somewhat less powerful than potassium is not by any means so apt to disorder the stomach, and is preferable in some cases on this account. It possesses no other advantages.

The bromide of lithium has been highly recommended in intractable cases by Weir Mitchell, who even states that it may be given in one-half the dose of the potassium salt with equally good effects.

The bromide of nickel cures some cases where all other remedies fail, but this is rare. In a series of physiological experiments made by the writer some years since, he found it virtually identical with the potassium salt in its action, and it is useful in about the same doses and cases as bromide of potassium.

The bromide of ammonium is very irritant and disorders the stomach quite readily. It ought always to be used, when used at all, with some other drugs, the ammonium only acting as an adjuvant.

Several authors have tried hydrobromic acid, but it is very much more apt to derange digestion and to produce vomiting than any of the salts. The dose of the dilute acid is ½ to 1 ounce in a tumblerful of sweetened water.

The bromate of potassium has been used by Mitchell in not more than 5 to 10 grain doses with good results, but is more dangerous and scarcely of greater value.

There can be no doubt that in some instances what is known as the mixed treatment is successful when all else fails. This consists most commonly of a prescription in which the bromide of potassium, sodium, and ammonium take part. Why this combination acts better than any one of the salts alone no one knows, but it is certainly a clinical fact.

In other cases still, digitalis when used along with one of the bromides seems to attain favorable results. Indeed, digitalis has for years been used alone in epilepsy with fairly good results, and should always be used in obstinate cases. In *petit mal*, where bromide of potassium alone so often fails, it is useful, and several English writers, notably Gowers, assert that its best effects are in cases of nocturnal epilepsy. Why this should be the case no one knows, and it would seem doubtful whether it does any more good in nocturnal attacks than in others. Indeed, it is difficult to understand how it can influence epilepsy at all, for its action on the nervous system is slight, save in toxic amounts, when it lessens reflex action very markedly, first by stimulation of Setschenow's reflex inhibitory centre, and later by paralysis of the spinal cord. This latter action never occurs, of course, in its medicinal use; but in medicinal doses it may, by acting on the inhibitory centre, allay convulsive tendencies. Probably its chief action is through its circulatory effects, and further study may show it to be efficacious only in those cases where a heart tonic is required.

Another combination very much employed and lauded is bromide with belladonna, the mydriatic being alone almost useless, but of great antiquity in its use in epilepsy. Like the mixture of digitalis and bromide it succeeds very frequently in *petit mal*, and indeed seems to be much more successful than the digitalis, but its mode of action is exceedingly doubtful. As the drug acts even more powerfully upon the nervous system than the circulatory apparatus, it has been thought that its influence for good depended upon this effect, but the experiments of Seppilli contradict this belief, for he found that if atropine was given to an animal the surface of the cortex cerebri responded more readily than is normal to stimulation.

At one time it was held that belladonna acted on the spinal cord and peripheral nerves under such circumstances, but it should be remembered that we now know that atropine is only of value in relaxing spasm when given in full dose, oftentimes hypodermically, and that Albertoni has made a series of experiments to determine whether it irritates the motor centres of the cortex. In his hands repeated small doses or one large dose in no way retards the convulsions produced by stimulation of the brain. Both these investigators are, therefore, in accord.

Under these circumstances it affects rather the motor nerve endings than the central nervous apparatus. At the present time those who believe the origin of epilepsy to be dependent on cerebral vasomotor spasm rest the occasional good results from the use of this drug on its vaso-motor influence, but there is a good reason for throwing this idea aside, even if the morbid process named was really present, namely, that the drug in ordinary medicinal doses raises arterial tension by stimulation of the vaso-motor centre, while it only lowers blood pressure when given in toxic amounts, and then by an action on the bloodvessel walls.

As long ago as the early part of this century *cannabis indica* came into notice in the treatment of epilepsy, and is probably of greater value alone than when combined with any other drug, unless it be the bromides. Although it is at present rarely so used, the author believes from his own studies that it is of value; for he found that it distinctly lessens reflex action and acts powerfully upon the higher nervous centres in the brain. Its use and value in migraine are undeniably of the greatest importance, and epilepsy and migraine are often very closely allied.

Gelsemium sempervirens is an American plant whose praises have been widely heard in almost every disease. Its influence alone is worthless, for it possesses no power over the cerebral centres whatever; but, in combination with cannabis indica it makes a very useful agent, and depresses the conducting power of the spinal cord, while the cannabis indica in its turn quiets the cerebrum. The dose of the tincture is 20 drops, but it should be remembered that it is as poisonous as the other is innocuous.

Owing to the soporific influences exercised by opium it has been very frequently tried, with success and failure as a result. It certainly has not taken any rank in the list of remedies, and is deservedly lacking in professional favor. It increases reflex activity very commonly and seems to affect the intellectual areas of the cerebrum rather than the motor portions, although Seppilli's experiments show it to exercise a decided depressant influence over these areas. Combined with gelsemium it may perhaps be employed, but only when nothing else is at hand, or all other remedies have failed. If it is so employed great care is to be used, and it should not be forgotten that both drugs kill by respiratory failure. When used in "status epilepticus" it often does good in relieving the spasm, but it must be employed in large doses, and if the succeeding coma of epilepsy has added to it that of large doses of opium death may ensue.

The employment of zinc, in its various salts, has been greatly recommended for many years, but has found little favor of late among the profession.

It has been stated that it quiets the cerebral cortex, the medulla oblongata, and spinal cord, and, in this way, cures the attacks. This is, however, merely clinical evidence, and has no experimental proof to support it. Even its most sanguine supporters confess that its range of usefulness is generally in those cases where the bromides succeed, and agree that its powers are much inferior to these compounds. The dose of the oxide is 3 to 7 grains twice or thrice a day, and even in this amount it may cause nausea and vomiting. The citrate is more soluble, and is better borne by the digestive apparatus. Its influence over the disease is probably the same, as is also true of the lactate, which was so largely used by Herpin, and which is the best salt of zinc to use.

Nitrate of silver was brought into use long before the value of more recent drugs was known. Every one is agreed that it lacks all power for good, save when it was used constantly for a long time. As the drug is eliminated very slowly it rapidly accumulates, and argyria soon comes on. It may be used after all else fails in doses of ⅙ to ¼ grain thrice a day after meals, the mucous membrane of the inside of the lips, and the conjunctiva, being carefully watched for the early signs of chronic silver poisoning. We certainly have no knowledge as to its influence on the nervous system; and, if it acts at all, it must be by some alterative influences rather than by any other means.

Nitroglycerin is to be employed rather in *petit mal* than *haut mal*, in the dose of 1 drop of a one per cent. solution, once, twice, or three times a day. Our knowledge of its effects, so far as its curative influences are concerned, is very slight, but it really seems to benefit some cases. Its action is very fleeting, and it influences the brain very little, except it be taken just before an attack is expected, or where the cardiac action is defective. Its great lethal power should never be forgotten.

The use of the nitrite of amyl is not for the purpose of directly curing the disease, but of warding off impending attacks, the warning of which is given by an aura of slow progression. It increases the severity of *petit mal*, but in epileptics who have a prolonged aura we may use nitrite of amyl pearls, which consist in small glass bulbs containing a few drops of the drug. As the aura comes on, the patient should break one of these in his handkerchief and inhale the drug, thereby putting aside the attack. The influence which the drug exerts upon the brain is secondary rather than primary, and is probably dependent on its action on the blood or circulation. Its influence on the spinal cord and nerves is much more marked and direct, and it is most certainly a very powerful spinal depressant. As its influence over unstriated muscular fibre is very great it affects the vaso-motor system very powerfully; and those who think that epilepsy is due to vaso-motor spasm at the base of the brain point to the effects of this drug as a proof of their hypothesis. Such reasoning is not, however, necessarily correct. Nitrite of amyl puts aside an attack by a sudden shock to the nerve centres, which diverts them, so to speak, from their intended discharge, very much as a ligature around the arm stops an aura. When we remember that the drug acts instantly and converts nearly all the oxygenating blood of the body into a non-oxygen-carrying fluid, by reason of the nitrite-oxy-hæmoglobin produced, the sudden change in the cerebral nutrition and state is most marked.

In the "status epilepticus" it is of great value in stopping the seizures, and may be used under these circumstances in heroic amounts, applied at intervals to the nostrils. In the tonic spasm, if it be severe enough to stop respiration, it should be remembered that as the drug is not inhaled it is absolutely worthless. It is only when a moment of relaxation occurs that it does its work.

As a general rule, the nitrite of ammonium or sodium, which are prolonged in their effects, should be used to supplement the amyl salt.

Gowers states that nitrite of amyl does good in epilepsy by flooding the brain with arterial blood. How such a statement can be made by anyone is amazing. Of all the drugs in the world nitrite of amyl produces exactly the opposite change, as Gowers should be aware, from his own use of the substance.

The use of anæsthetics in epilepsy is virtually useless, and, in some cases, dangerous, for ether is too slow in its effects and may, by its irritant vapors, increase the tendency to laryngeal spasm or cause lung complications. Further than this, if uræmia is the cause of the fit, and this fact is unknown in every case until it is carefully examined, the ether may increase the inflammation of the kidneys very seriously.

Chloroform, though it acts much more rapidly, may cause sudden cardiac failure, and both drugs may increase the post-convulsive coma very greatly.

In "status epilepticus" they may be used, as in such cases the convulsions must be stopped at all hazards, although the preference should always be for amyl nitrite.

The iodide of potassium is entirely useless in epilepsy unless it is due to syphilis, when it is of the greatest service. Indeed, the bromide and all other drugs should be set aside while it is pushed to the utmost. As is well known, syphilitics usually bear the drug extremely well; and the author knows of one instance where no less than 800 grains were taken every twenty-four hours with rapid improvement as a result. This point is strongly insisted upon by all therapeutists and syphilographers, notable among whom stands Fournier.

Where the convulsions are due to a gumma the iodide of potassium is, however, too slow in its action and should be replaced by mercury in order to break down the growth without delay, lest a seizure end the scene by asphyxia or some similar accident.

Some difference of opinion exists as to the usefulness of iron in epilepsy. Several very eminent clinicians have asserted that it always makes the attack worse and, therefore, does more harm than good. Like everything else, iron is no more to be given in every case than is a dose of oil; when there is plethora it is harmful, and when there is malnutrition and anæmia it does good. Over the disease itself it has really no effect at all, except through its action on the general system.

Chloral hydrate is a remedy which has been only partly tried in epilepsy, and its usefulness is not as yet determined. It possesses the marked disadvantage, as compared to the bromides, of being a very fatal poison, which is an important fact to be borne in mind by the physician, when giving it to the patient, whose mind, already weakened by the disease, or naturally stupid, may forget and take too much. Its physiological action indicates much more fully than many other much more lauded remedies that it may be of value, since it exerts its chief influence on the motor pathways of the spinal cord and quiets the motor portion of the cerebral cortex and also produces sleep. Seppilli has proved this, by direct experimentation after the method employed by Albertoni. Its use, combined with one of the bromides, is often accompanied by the most desirable results, and should be tried at all times unless some cardiac complication forbids it. It may disorder the stomach, and should, like the bromides, always be given well diluted and after meals.

Of the more recent remedies acetanilide certainly stands in the foremost rank, and bids fair, in some instances to rival the bromides. Professor Germain Sée, myself, and some others have reported cases which obtained very marked relief from it, and more recent investigators have done likewise. The drug will be found to exert its chief benefits in chronic epilepsy. At least, if a child was brought to the author with a beginning epilepsy, he would use the bromides, but, if the disease was chronic, acetanilide.

Antipyrine has also been pushed forward as a remedy, and as the physiological action on the nervous system is virtually identical with acetanilide, the writer will speak of them together.

Antipyrine has been recommended by Lemoine in certain forms of epilepsy, but condemned in most cases. In those who *suffer from menstrual epilepsy*, so-called, or in those in whom the attack is produced reflexly by the presence of intestinal parasites the drug does good.

Lemoine also found it very useful in those cases associated with migraine. In these cases the results were better than with the bromides, but in the idiopathic, simple varieties it was useless. Mairet and Combemale have used the drug in epileptiform mania with satisfactory results.

In children suffering from frequently recurring epileptic attacks the presence of worms should always be looked for, and when found should be expelled as rapidly as possible. If they are the *oxyuris vermicularis* (seat worms) the best remedy by far is the injection of a strong infusion of quassia of such a strength that there are 2 ounces of quassia to each ounce of water.

In girls, where the removal of the worms from the rectum is not followed by relief, a careful examination of the vagina should be made and quassia employed in somewhat weaker solution, as very commonly intense inflammation is there present, produced by migratory movements of rectal parasites. If the quassia is unobtainable in any case, a saturated solution of chloride of sodium may be employed.

The treatment of epilepsy by borax has not received very wide recognition. Perhaps the most thorough studies of its effects have been those of Gowers in England, and Folsom in America. It would seem that some cases which are obstinate, under ordinary treatment, are benefited by it, but it certainly is not to be commonly employed. The dose generally given is about 15 grains.

Borax

Having spoken of the drugs which may be given to epileptics, attention may be drawn to those which may not be used. There is a very large amount of reliable evidence, both experimental and clinical, that quinine should never be employed where it can be avoided. Thus Seppilli, in his researches, found that it increased the irritability of the cerebral cortex, and Briquet has asserted that it is a direct cerebral stimulant. That toxic doses of quinine may provoke epileptiform convulsions has been proved by Jakowbowich, who has seen them in dogs and in other animals, and Brown-Séquard and Albertoni have noted that cinchonidine and quinine always increase the number of attacks in epileptics.

Salicylic acid, too, has an effect upon the brain very closely allied to that of quinine, and should always be used with care in epilepsy. Prof Germain Seé has also pointed out that large doses of this drug produce violent epileptiform convulsions in the lower animals.

Strychnine, while its chief effect is to heighten the activity of the spinal cord, also, according to Seppilli, increases the irritability of the cortex and should be employed only in particular cases. The same writer also found that absinthe and picrotoxin predisposed to epileptic seizure by increasing the excitability of the motor zone.

Bleeding the patient in epilepsy, unless there is great evidence of cerebral congestion, which is exceedingly rare, is harmful rather than of value. Orschansky found that removal of one-seventh of all the blood in the body by the femoral vein did not lessen the irritability of the cortex, and Minksowsky ligatured all the blood-vessels going to the brain without decreasing its excitability. We know also that cerebral anæmia produces epileptic attacks.

A very important point, which is constantly brought before the physician who is treating epilepsy, is that of diet. Nearly every patient inquires what he shall eat, when he suffers from this disease. Very few researches of a thorough character have ever been carried out on a large scale to determine the things which may or may not be ingested. Of course, nearly every one of us knows from our personal experience that red meats are hurtful, particularly in children. Curiously enough the influence of diet in one research covering a number of cases of chronic epilepsy, seemed to be of little moment. Thus, Merson examined twenty-four such cases, putting twelve of them on a purely vegetable, and twelve on a purely nitrogenous diet. The result, after this had been continued for two months, was that the vegetarians had had a few less fits than the others, but the difference was so slight as to be almost of no weight in determining the question. Some authors at the present day believe this opinion as to the harmfulness of meats to be erroneous, and Gowers is one of them.

EPISTAXIS.

Nose-bleed depends upon many causes, the chief of which are traumatisms, plethora, the presence of ulcerations in the nasal chambers, and the prodromata of typhoid fever.

Probably plethora is the most frequent cause of nose-bleed, and in most instances is an attempt on the part of the system to rid itself of an excess of blood. Under these circumstances it is not dangerous nor is it worth while to treat it unless it becomes excessive. Where it is excessive, or where it must be controlled for any reason, the measures to be adopted are both medicinal and non-medicinal. If the person be full-blooded and strong, full doses of tincture of aconite or veratrum viride are useful, say 2 to 4 drops of one of them followed in a half hour by a smaller dose, if necessary. Some physicians have recommended ipecac in full nauseating doses to relax the arterial system. Powdered alum, pure, or half and half with starch, may be snuffed up the nostril, and tannic acid in powder or in solution may be used with advantage. If this does not control the hæmorrhage an atomized spray of Monsel's solution in the strength of 30 drops to 4 ounces of water may be of service. Ergot in the form of the fluid extract in the dose of 1 drachm may be given, or its wine in the dose of a wineglassful employed. Sometimes in slow oozing internal doses of turpentine, oil of erigeron or hamamelis do good. As a household remedy, vinegar may be injected into the nostril, or lemon-juice be employed in the same way.

All these remedies act as styptics when locally applied, by causing coagulation of the fibrin and the formation of a clot, while the internal remedies produce local contraction of the bloodvessels in the inflamed area, this area being more susceptible to the influence of these drugs than the rest of the vascular system.

The value of these drugs depends upon their power of lowering blood-pressure, and in consequence decreases the leakage from the solution of continuity in the bloodvessel.

The non-medicinal measures to be employed, if the bleeding be severe, consist in plugging the anterior nares with pledgets of cotton or pieces of lint soaked in vinegar. If this does not control the hæmorrhage, the posterior nares may also be closed by plugs, and compression of the facial artery of the same side be made upon the superior maxilla near the nose, thus decreasing the blood supply. The head must be kept raised and the patient must not bend over or wear a tight collar.

Sometimes, if the patient raises one or both hands high above the head, the hæmorrhage ceases. This is due to the fact that the easiest pathway for most of the blood is straight up the brachial arteries rather than through the tortuous vessels of the face. A hot foot-bath, by dilating the veins of the lower extremities, draws away the blood from the face and is a useful measure. In other cases, a hot-water bag applied over the dorsal vertebræ is efficacious, and sometimes cold when so used is of service. A piece of ice pressed against the nose may prevent further hæmorrhage, by causing localized anæmia.

Where the nasal hæmorrhage results from traumatism, with fracture of the bones, and great loss of blood ensues, ligation of the bleeding vessel or its supplying vessel should be, if possible, resorted to.

ERYSIPELAS.

This disease is now being studied very widely, because of the general recognition that it is dependent for its existence upon a germ, and the dispute as to whether the disease is purely local or constitutional, in its milder forms or phases. The changes which have com forward in its treatment are chiefly the local measures, while thos which have been used internally for many years have suffered n alteration.

Whether or not erysipelas is a local or systemic disease has littl to do with the proper treatment. In any case it is an inflammatio and as such must be treated. In its early manifestations and wher some uncertainty may exist as to its true character, aconite or veratrum viride may be used in sthenic cases in which the nervous and circulatory systems give evidence of reflex irritation, and the pulse is hard and full. Those remedies are contra-indicated if any tendency to weakness exists. Da Costa has recommended, and others have carried out with success, the use of pilocarpine in sweating dose ($\frac{1}{8}$ to $\frac{1}{6}$ grain hypodermically), in these early stages, and in some instances the injection may be made at the margin of the inflammation with advantage, as this method seems to control the development and spread of the disease. The objection to the use of these injections about the inflamed area rests in the possibility of the formation of a slough, which when infected would speedily change a superficial lesion into the phlegmonous form of the disease. As with aconite and veratrum viride, it is to be remembered that this use of pilocarpine is not to be resorted to if debility exists. When asthma is present, or the disease is too far advanced to be aborted, belladonna in the dose of 3 to 5 minims of the tincture every four hours should be used. It may also be locally applied on lint with benefit, or belladonna ointment may be smeared on the skin.

The internal treatment of erysipelas *par excellence* is the plentiful use of the tincture of the chloride of iron (20 to 30 drops, or even 40 drops) three times a day. The diet should be regulated and the bowels kept in good order, while any excessive febrile movements are to be treated by the use of antipyretic drugs such as antipyrine. Where the patient passes into the typhoid state, supportive measures must be used and alcoholic stimulants added to the food, which should be predigested or prepared so as to be readily absorbed.

During convalescence the use of tonics, both in the form of iron and bitters, is particularly indicated, if recovery of strength is slow. The local treatment of erysipelas is very varied, but in the majority of cases resort need be had to but one or two methods. By far the best dressing for the general run of cases of erysipelas is a modification of that of von Nussbaum which the author has tried in a number of cases with great success. The skin of the part involved is carefully washed with castile soap of the purest form which is washed off by a 1 to 1000 solution of bichloride of mercury. The skin is dried with a soft towel and a thick coating of ichthyol and vaseline applied, the strength of this ointment being half and half. Over this are placed antiseptic gauze or sterilized absorbent cotton and adhesive strips, or a bandage is used to keep the dressing in place. Sometimes the ointment alone may be applied if the area is small. Under this treatment the results are often extraordinary in all stages of the malady. Where ichthyol is not obtainable, a thick coat of white lead paint, as it is sold in cans before it is mixed with any thinning substance, will be found of service in an emergency.

The plan recommended by Higginbottom of applying nitrate of silver is often successful. It consists in the use of a solution of the strength of 80 grains to 4 drachms of distilled water, which is thoroughly applied with a camel's-hair brush over the entire inflamed area, and a little beyond. The application must be made twice or thrice to secure a good coating. This treatment will often arrest the inflammation and prevent its spread, but has caused sloughing.

EXHAUSTION AND DEPRESSION.

While the treatment of both these conditions is almost identical in some respects, it is, nevertheless, important that a clear idea of the difference between the two be clearly understood, if for no other reason than that the physician may recognize that exhaustion is a far more serious state than depression. It also requires more careful treatment. The man who is depressed retains in his body all the vital forces necessary for the maintenance of life, but they are temporarily in abeyance from some cause. As soon as the incubus is taken away, the system at once asserts itself and recovery takes place. This is not the case with a man suffering from exhaustion. In this patient every particle of his strength is sapped and lost. The man depressed is the giant lying unconscious from a blow on the head; the man exhausted is that same giant after a long attack of typhoid or other fever of a similar nature. The treatment of depression is stimulation; of exhaustion, not only stimulation, but feeding and protection from exposure.

FEET—SWOLLEN, TENDER, OR SWEATING.

These comparatively simple, yet annoying, conditions are often brought before the physician for relief, and patients suffering from them will frequently be more grateful for skilful treatment and relief than in the event of recovery from a severe illness.

Swelling of the feet occurs chiefly in two classes of cases, excepting, of course, dropsy. These are old persons taking too little or too much exercise, and who may have gouty or rheumatic tendencies, and those who, by constant standing or walking, cause congestion of the lower extremities, chiefly by fatigue or bad shoes, or by uneven surfaces in the ground, causing bruising. Where the swelling takes place in the first class small doses of arsenic, in the dose of $\frac{1}{40}$ to $\frac{1}{60}$ grain, often do good, and careful examination should be made of the circulatory, renal, and respiratory apparatus to discover any weak points, such as vascular relaxation or tendencies to varicosities. The distilled or fluid extract of hamamelis is often of service in the dose of ½ to 1 drachm of the former and 10 to 20 drops of the latter preparation. In some cases absolute rest of the feet will be necessary before cure is reached.

Where the feet are tender the most common cause is bruising from too thin soles on the shoes, too tight shoes, and from abrasions or skin disease. More commonly than all, they become sore from excessive sweating and resulting maceration.

The treatment of sweating and tender feet is, of course, the removal of the cause and the use of remedies designed to toughen and harden the skin of the parts. Probably the best application for this purpose is a solution of salicylic acid and borax, half and half, in water, and glycerine rubbed over the feet night and morning. If the sweating is very severe the stockings worn should be clean each day, and previously soaked in a strong solution of borax and dried. The following prescription affords a useful powder:

℞.—Pulv. acid salicylic	gr. xx to xl.
Pulv. acid boric	ʒij.
Pulv. amyli . . . . q. s.	ʒj.

M.—S. To be dusted over the feet night and morning, after washing and thoroughly drying them.

Sometimes the use of cotton instead of woollen stockings may aid in the cure.

FEVER AND ITS TREATMENT.

(*For the Treatment of each Fever see its Title.*)

At the present time the medical profession are almost universally of the opinion that fever is a disorder of calorification dependent upon nervous action, such nervous action being the result of various causes, such as the presence of poisonous materials in the blood, or of perverted functional activity. The first may be represented by the fever of any infectious disease. The second by the so-called hysterical hyperpyrexia. Turning from the general question of fever to those of drugs which combat it, we are met at once by an array of synthetically prepared substances which are almost without number, and which are derived chiefly from the tar found always in close proximity to deposits of coal.

The value of a drug which can decrease high temperature by influencing heat-production alone cannot be over-estimated, and while several drugs seem to influence this part of the heat apparatus, more than that portion connected with the dissipation of heat, we have no substance which is distinctly and solely capable of exercising an inhibitory power over the development of heat in the body. Frequently one of the substances put forward by its discoverer as a useful antipyretic remedy has been found so to depress the heart or respiration that it cannot be used, while others produce secondary lesions in the tissues of the body by a more slowly acting influence. For both experimental and practical purposes we may, therefore, divide antipyretics into three great classes. First, the substances which allay or prevent fever by inhibiting its production; second, the drugs which possess the power of decreasing bodily temperature by increasing the dissipation and decreasing the production of heat, and third, the compounds which allay fever, not by stopping the manufacture of heat units but so increasing the exhalation of heat that the loss is greater than the manufacture. The first and third of these three classes are directly opposed to one another. The second class is half way between, and it is to this class that most of our antipyretic drugs belong. The first is the ideal, the second is the one we have to be content with; the third is the one used by our forefathers, and is the most dangerous and unreliable, since the tissues are quite as rapidly destroyed as before the drug was given; the centre of the body remaining in pyrexia, while a cool skin and extremities are apt to lead the physician into the belief that the fever no longer exists. The tissue-waste of the fever goes on unchanged, and the patient, if the disease be prolonged or asthenic in character, is in almost as bad a way as when no such antipyretic attempt has been made. Almost as badly off, because it should never be forgotten that hyperpyrexia, or even ordinary fever, is dangerous in two ways, namely, by destroying tissue and reducing vital power, and by acting simply as too great bodily heat and thereby producing nervous or cardiac symptoms, such as are seen in cases of sunstroke and heat-exhaustion, where the condition of the patient is the result of coagulation of the cerebral or cardiac protoplasm, or is one of depression of all vital function.

Closely allied to this question is that which asks us to define what we mean by hyperpyrexia. As given by most workers upon fever this term is applied to any state in which the temperature reaches 106° or 107° F.; but in reality this has nothing to do, except in an indirect way, with what the student or physician wishes to know. This is but another example of the fact that the presence of a high temperature alone does not constitute the sole indications for the treatment of the disease, the physician being governed by the state of the patient who is laboring under the malady. A temperature of 106° F. in a young healthy man, suffering from an attack of some short-lived disease, does not mean very great danger; but a temperature of 103° day in and day out in typhoid fever does mean danger, and must be carefully attended to. In a simple continued fever 106° F. is a hyperpyrexia In typhoid or other low fever 103° F. is a hyperpyrexia. The question is one not of actual degrees Fahrenheit, but rather as to whether the temperature present is doing any harm.

Turning to the drugs, which are divided into classes, named from their physiological effects, we may, in view of our present knowledge, class them as follows: First, those which decrease heat-production alone are not known. Second, those which act both on dissipation and production are antipyrine, antifebrin, carbolic acid, salicylic acid, similar substances, and quinine. In this class, also, should be placed cold bathing, which probably decreases heat-production as well as increases heat-dissipation. Third, those drugs which only dissipate heat, as far as we know, namely, the great group of cardiac sedatives and their allies.

No one is more sensible of the fact than the writer that this arrangement of the subject is partly artificial, but in the present state of our knowledge it probably is the best we can do.

Though a number of writers have claimed that certain antipyretic remedies of equal power act with different results in different diseases, the writer has never been able to see any such distinction, and we must be guided rather by experience as to the value of some particular antipyretic in all diseases than by any other rule. All observers are not in accord, however, as to the best one of this class. While phenacetin has been spoken of very highly by some authorities, the writer has heard it equally condemned by others, and although Ringer prefers antipyrine, Mitchell Bruce relies chiefly on antifebrin, while in America almost every one prefers the former drug, the general diffusion of this opinion apparently resting upon wide experience. While the number of cases of ill-effects recorded are small with antifebrin as compared with those of antipyrine, the idea prevails, and perhaps justly too, that the former is much more capable of harmful effects than the latter, and it cannot be denied that scientific basis of great weight exists for this belief.

It may be said that we have only three measures for the relief of fever which are reliable and have stood the test of time. These are antipyrine, acetanilide, and the use of cold. (For the mode of using antipyrine and acetanilide see pages 29 and 59, and for the use of cold see page 313.)

For many years the profession of medicine has been in the habit of feeling the pulse with the perfectly proper object of determining what the state of the system is as it appears on this sign-board of the body, but it has only been of late, when our knowledge has increased, that we have come to consider the pulse rate and force as something more than a simple aid to diagnosis. At present many seem to forget that the very value of the pulse, as a sign-board, depends upon its readiness to obey the beck and call of the variations in the body, and to consider that, in fever, for example, the pulse is rapid, not because the fever makes a rapid pulse, but that a rapid pulse and fever are equally dangerous conditions, both of them of primary importance; in other words, these persons regard the rapid pulse, not as the result of a high temperature, but as a symptom in itself.

While in our present state of knowledge, concerning the poisons which produce fever, we cannot assert that none of them act on the heart in the same manner as does a drug, thus altering the pulse rate and force; we are able, by experiments, to prove that high temperatures of themselves do seriously alter the heart-beat, and, in addition, that antipyretics, as a general rule, in lowering the fever lower the pulse, not directly, but indirectly. Such results are to be gleaned from the studies of Lauder Brunton, Newell Martin, and several other workers in this field, who have found that febrile temperatures stimulate the accelerator cardiac nerves.

Closely associated with this question is that of the relationship between arterial pressure and fever. It at once becomes evident that, if heat stimulates the accelerator nerves, an increased rapidity of cardiac action must ensue, and, in consequence, an increase in the amount of blood thrown into the arteries must result. As a consequence of this the arterial pressure must rise, even if the vaso-motor system gives response in no way to the heart. In nearly all cases of high fever, however, unless the system be greatly exhausted, the vaso-motor apparatus certainly is excited to increased activity.

As the writer has spoken of the dangers of high fever it is not right that the impression be given that every one believes with Liebermeister in the absolute harmfulness of such states. While the profession in general accept such views the opponents to them, while not larger in number, have been so prominent, as individuals, that their studies cannot be passed by. In 1883 Unverreicht tried to rebut the testimony then so rapidly accumulating in favor of antipyretic measures, and, still later, Naunyn, in a very carefully written and logical paper, denied positively their value and usefulness. While he grants that high temperatures are most important in prognosis and diagnosis, and that certain antipyretic measures do good, he, nevertheless, insists that, though the cold bath does good primarily, its effect upon the nervous system nullifies its direct action upon the fever. He acknowledges, of course, that such temperatures as 108° or 110° F. are of dangerous import in themselves. To prove that his assertions are correct, Naunyn gives results reached in a series of studies made by him on animals. He found that healthy rabbits will bear a temperature, artificially induced, of 106° to 107° F., rising at times to 108° to 109° F. for days together without any injury. He further states that in many autopsies he has failed to find any lesions present as the result of exposure, except a slight cloudiness of the renal epithelium. The author cannot help calling attention to two facts which Naunyn apparently overlooked, as well as many of the readers of his paper, namely, that 106° to 107° F. are only a few degrees above the rabbit's normal heat, which is about 103° F., so that the pyrexial temperature of these animals corresponded to but 101° or 102° in man, a temperature easily borne in many fevers. Second, it should be remembered that this heat was applied constantly in these studies to the animal, which did not have to manufacture the heat itself. Although, at first, this seems unimportant, it should not be overlooked, as the tissue-changes in the two instances are entirely different; to use a homely simile, in one case the stove is kept going by heat applied to it externally without the combustion of its tissues, the coal; in the other case, the stove is kept hot by the use of the coal itself. Very different changes are naturally found in the two cases in the coal. The author cannot go further into these questions; suffice it to state that while high temperatures are borne in some instances with no evil results, the majority of cases do not turn out so favorably.

The various opinions expressed by well-known German clinicians concerning this question have been condensed by Ziemssen. Speaking of the worth of antipyresis in any form he divides the writers of the last twenty years into groups, as follows: First, the extreme hydriaticists who use only cold bathing and object to internal antipyretics, such as Vogel, Winternitz, and others. Second, the moderate hydriaticists, who resort to lukewarm baths, but reject internal antipyretics, among whom may be named Naunyn, and others. Third, those who, according to indication, resort to moderate hydropathy and to antipyretics, such as Jürgenson and Reiss. Fourth, those who consider fever as a salutary and necessary regulator, and only resort to antipyretics when dangerous symptoms arise, as Heubner, Curschmann, and others. Fifth, those who claim that fever is a necessary phenomena, and, therefore, reject all attention to antipyresis and attend to diet (Glaser). Those who absolutely deny the influence of treatment on the mortality of fever (Port).

Truly, it would be hard to find a set of more diverse and contradictory opinions on so limited a basis, but the practice of Jürgensen and Reiss has virtually proved its value and it is resorted to by most of us. Those who have tried it rely on this method very largely and it has been found to be of great benefit, and is certainly an advance in therapeutics.

A very important question arises as to the value of the cold pack in private practice. There can be no doubt of its acting well under these circumstances if carefully carried out, and it is certainly much the best remedy for fever where trained nurses are on hand to administer it, but where only members of the family are in care of the sick man, and where the doctor can only be on hand once in twenty-four hours it is manifestly impossible to resort to it. Even if the bath be properly given the exhaustion produced by clumsy handling may more than counterbalance all the good achieved. It has been claimed that the cold pack never results in cardiac failure as does the use of antipyretics. We are quite confident of the fallacy of this statement. Indeed, the writer has recently seen such a case. The cold pack cannot be used more carelessly than antipyretic drugs, and it is probable when this measure is more widely employed more reports will appear in the medical magazines of such accidents occurring as the result of its abuse. (See Cold in Fevers, p. 313.)

Sthenic Fevers.

The application of antipyretics to the febrile temperatures occurring in sthenic cases has an entirely different outlook and purpose than their employment in the prolonged low fever of the adynamic type. There can be little doubt that in the sudden excessive outbursts of febrile temperature in a child, with no acute disease underlying it, antipyretics are of great value, and there are also reasons for their employment in order to favor popular prejudice. In America, at least, a physician visiting a case of croupous pneumonia for the first time and finding the patient with a high fever would not be allowed to give the patient a cold bath if the friends could prevent it, and he must, in consequence, fall back upon antipyretics. Again, the fever of such cases cannot be prolonged enough to necessitate the use of antipyrine day in and day out for weeks at a time, and there is, therefore, less danger of the patient being injured by its influence. In scarlet fever the use of such remedies should be most carefully watched, for the double reason that the kidneys are in danger and that the disturbances accompanying the fever may last a long time.

In pneumonia and erysipelas in strong persons antipyretics find their true place. Lasting about a week in their febrile activity these diseases are often accompanied by sudden hyperpyrexia which must be overcome at once by a drug, and they are so apt to rise at any time to a dangerous temperature that some remedy often has to be left in the hands of the nurse with instructions to use it if a hyperpyrexia should assert itself.

In thermic fever or sunstroke the employment of antipyretics is often useless. The excessively rapid upward rush of the temperature responds in no way to drugs, and there are cases on record in which the use of antipyrine has utterly failed of good result. Thus, in one case reported by Singer, a man suffering from thermic fever with a temperature of 108 degrees received 50 grs. of antipyrine hypodermically at 6 P. M., at 7 P. M. he received 10 grs. more under the skin, at 8 P. M. 20 grs. more, and at 9.30 another 20 grs. were used without effect. In other words 100 grs. in three and a half hours proved useless. In children suffering from excessive heat during summer weather antipyrine seems to be very useful, and has been highly recommended by Demme.

Asthenic Fevers.

(*Typhoid Fever and Fevers of a Typhoid Type.*)

In the opinion of the author antipyretics should play a secondary rôle in the reduction of the pyrexia of the typhoid state, our main reliance being upon cold applications, the antipyretics being used as an adjunct to help the cold pack or bath. Aside from the fact that he has found such an opinion well founded in a large number of typhoid fever cases, logical reasoning endorses its correctness. Even if antipyretics were perfectly innocuous, their constant use in fever would but give the already over-strained kidneys the task of their excretion, while the stomach, sufficiently disturbed by necessary medicines and illness, has enough to do without an additional load. Further than this, we know that these drugs are not perfectly harmless, and we also know that they act on the protoplasm of the body, and in consequence must gradually lose their power, which is not the case with the cold pack. The writer is sure that in typhoid and other low fevers of the continued type antipyretics should be given only when the cold pack cannot be used or at the end of the cold application, to prevent the temperature from bounding upward after its depression. Further than this, fever will sometimes resist all doses of antipyretics we can give, or all that it is safe to give, but no fever can resist the cold pack. In diseases of a more chronic type, particularly those represented by phthisis, antipyretics are of doubtful value, owing to the increased sweating which is so apt to be produced, and unless the patient seems to be particularly robust they should not be employed except in the smallest available doses.

FRECKLES AND CHLOASMA.

The removal of freckles is readily accomplished, but their return is inevitable if any exposure to the sun or wind occurs. One of the best applications for their removal is a solution in water of corrosive sublimate varying in strength from 1 to 4 grains to the ounce, and applied night and morning until the skin shows that it is irritated, when it must be stopped for some days, after which its use may be begun again. A very efficient, and much less dangerous remedy to leave about the room where children are allowed to play, is a saturated solution of boracic acid in water applied in the same manner as is the solution of bichloride.

Another remedy is lactic acid, 10 grains to a drachm of water, used in the same manner as the solution of the bichloride of mercury. The following prescription is recommended by Unna:

R.—Bismuthi oxidi Pulv. amyli	ãã	gr. xxx.
Kaolin		ʒj.
Glycerinæ		f℥ij.
Aq. rosæ	q. s.	f℥ij.

M.—S. Paint on spots and allow to dry, washing off before each application.

Or the following may be used:

R.—Zinci oxidi	gr. iij.
Hydrarg. ammonia.	gr. jss.
Ol. theobromæ	fʒijss.
Ol. ricini	fʒijss.
Essent. rosæ	gtt. x.

M.—S. Apply night and morning.

GASTRALGIA.[1]

The treatment of gastralgia may be divided into two parts—that directed to the relief of the attack when it is present, and that devoted to the prevention of other attacks. During the acute stage hot applications and drinks, aromatic and locally stimulating warm infusions, a few drops of chloroform, or brandy, or whiskey, hot and concentrated, or 30 or 40 drops of laudanum, may be used. Counter-irritation often does good, and in some cases, particularly if a suspicion of an hysterical element exists, a vigorous revulsive may act with surprising power. Emesis and purgation are sometimes indicated, since in the early attacks the cause of the pain may be suspected to be the presence of indigestible food.

The treatment required in the intervals between the attacks must vary with the cause and with the general condition of health. A careful search must be made for the real cause of the trouble, and when found it must be removed or palliated by appropriate measures.

The diet should be carefully regulated, and all the hygienic details of the patient's life be critically studied and directed. The avoidance of improper food, the abandonment of tea, coffee, or tobacco, the prescription of proper dress, exercise, or change of residence, may be followed by marked improvement in general health and by a cessation of the attacks of gastralgia.

In regard to remedies, it may be premised that all depressing drugs must be avoided, as well as all purgatives which would weaken the digestion. Any marked disturbance of digestion should be corrected; and this may require the use of pepsin, or of some tonic remedies such as was suggested in the article on Indigestion. The chief reliance is, however, to be placed upon the administration of arsenic and iron immediately after meals, in proper form and doses. Thus, we may direct:

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[1] See article written by author in Keating's Cyclopædia of Diseases of Children, vol. iii.

℞.—Liq. potassæ arsenitis . . . . . fʒj.
Vini ferri amari . . . . q. s. ad f℥iv.

M.—S. From 30 to 60 minims in water after meals, three times daily, for a child of six years, or twice this quantity for an adult.

Or,

℞.—Tinct. ferri chloridi . . . . . f℥j.
Acidi muriatici diluti }
Liq. arsenici chloridi } . . . āā f℥ss.

M.—S. From 4 to 20 drops in water after meals, three times daily.

Occasionally even better results are secured by the use of cod-liver oil in emulsion with hypophosphites.

It is well, in cases where the tendency to pain is decided, to combine with the above the use of a powder of bismuth subnitrate and saccharated pepsin, given about an hour or an hour and a half after meals. Constipation, should it exist, must be overcome by proper diet, massage, enemata, or by suppositories of gluten or glycerin or soap. If the bismuth favors its continuance too decidedly, small doses of cyanide of potassium, dilute hydrocyanic acid, or chloroform may be substituted at the same hours. In cases where a highly neurotic state exists, it may be necessary to alternate all other treatment with the bromides or preparations of valerian.

GASTRIC CATARRH, ACUTE.

By far the most important point in the treatment of acute gastric catarrh is the regulation of the diet, and the following abstract from the article written by the author for the third volume of Keating's *Cyclopædia of Diseases of Children,* embodies the ideas which the writer desires to express, so thoroughly, that he has inserted it here. This may be divided into two parts—first, the regulation of the food during convalescence or during the attack, and second, the character of the food to be used during the interval following one attack and preceding the next. Total abstinence in the acute stages of the attack, and absolute bodily and mental quietude, are advisable. There are several reasons for this. In the first place, the juices of the stomach are in an abnormal state and unfit to receive more food. Secondly, the mucous membrane of the stomach is already hyperæmic from the inflammation, and, as the normal viscus takes on a physiological hyperæmia on the ingestion of food, we would add to the congestion of the bloodvessels did we allow more nourishment to enter the viscus. Last of all, the excess of the mucus and lactic and butyric acids present renders any new food impure before it can be assimilated, and so prolongs the trouble. As the attack passes off, small amounts of food may be given, readily digestible and not likely to become easily decomposed or rendered acrid by the mucus in the stomach. Milk with a large percentage of lime-water is to be used, since the alkali not only prevents a too firm coagulation, but also decreases the secretion and action of the mucus. The thirst is often excessive, although anorexia is complete, and small pieces of ice may be administered for its relief. Commonly it will be found that the patient rapidly improves up to a certain point, then stops or relapses. This is due to an accumulation of mucus, which undergoes fermentation, and, if marked evidences of the presence of this secretion are given, a mild and gently acting emetic may be employed to dislodge the fermenting mass. Sodium bicarbonate with compound infusion or compound tincture of gentian may be used in convalescence, and small sips of effervescing draughts are useful. If constipation exists and vomiting forbids the use of the ordinary purgatives, a Seidlitz powder divided into fourths or fifths and taken in this way every fifteen minutes or half hour will settle the stomach, move the bowels, and often carry away mucus.

If there is much epigastric distress, a spice poultice is often of service.

Sweets and starches are to be rigidly denied the patient. If anæmia exists, iron may be used; but this is rarely needed.

The abdomen should be carefully protected with flannel, and draughts and unsanitary surroundings avoided.

The use of pepsin and of hydrochloric acid is to be much more thoroughly attended to than has heretofore been the custom. As a rule, we are apt to forget that pepsin acts largely by catalysis, and that it is not secreted as pepsin, but as pepsinogen, a substance which is changed into pepsin in the presence of an acid. For this reason hydrochloric acid should be freely employed, and pepsin given in large or small quantity according as there is reason to believe this ferment to be in normal or abnormal amount. Common salt (sodium chloride) is virtually identical in its ultimate influence with hydrochloric acid, and should be always used, in moderation, with the food.

Gastric Catarrh, Chronic.

Chronic gastric catarrh is a condition of the stomach commonly seen in this country in a more or less active form. It is often associated with much indigestion and the eructation of some liquids, or even with active vomiting. The secretions of the stomach are nearly always abnormal, and fermentative changes are constant in the gastric contents.

By far the best treatment for this condition is the use of counter-irritation over the epigastrium, the close regulation of the diet, and the use, internally, of nitrate of silver and extract of hyoscyamus, or, if any hyper-acidity exists, the addition of the subnitrate of bismuth. Constipation is nearly always present, and should be removed by appropriate drugs, such as cascara sagrada.

All fats, rich foods, strong meats, ham, bacon, or fried things are to be avoided, and only light broths, koumys, or matzoon resorted to. The nitrate of silver pill should be used half an hour before each meal, and be prescribed as follows:

℞.—Argent. nitrat. . . . . gr. iv.
Ext. hyoscyam. . . . . gr. x.
M.—Ft. in pil. No. xx. S. One, half an hour before each meal.

GASTRIC DILATATION.[1]

The treatment of dilatation of the stomach may be divided into two varieties—the first consisting of the methods of cure which are directed against the diseased state of the gastric walls themselves; the second, of those methods in which abnormal changes in the food and the gastric contents and secretions are combated, thereby allowing reparative changes to take place. As is well known, dilatation of the stomach may be dependent upon either some constitutional or some local cause. If the cause be rickets, it is evident that the malnutrition of the bony system and of the system in general is to be improved, and that remedies devoted to this object are to be given—cod-liver oil by inunctions, or, if the digestive apparatus will bear it, by the stomach. Lacto-phosphate of lime, phosphate of sodium, or iron, often in the form of the syrup of the iodide, should be used if any signs of struma are present. Good foods, possessing large amounts of salts, yet easy of digestion, are, under these circumstancs, particularly desirable, and by far the larger part of the treatment should be directed to the dietetics of the case. Of this the writer shall speak farther on.

There are several means to be employed for the relief of gastric dilatation other than those which can be called medical, so far as drugs are concerned

These consist, first, in efforts to evacuate the stomach and to cleanse it; secondly, in attempts by these and other means to prevent its distention by the gases which arise or by the accumulation of ingesta which takes place; thirdly, in the regulation of the diet so as to avoid causes which have a tendency to increase the disorder.

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[1] See article by author in Keating's Cyclopædia of Diseases of Children, vol. iii.

Dilatation of the stomach is so difficult to cure that very satisfactory results are not to be looked forward to, but, nevertheless, the nutrition and the general state of health are to be carefully considered.

Taking up *seriatim* the non-medicinal means which we have named, we come at once to the consideration of lavage, a method which has been resorted to with most thorough trial on the continent of Europe. Originally proposed by Epotius in 1863, it has been most widely employed in children by Epstein, who in one article alone records its employment in two hundred and eighty-six cases of gastric disease in infancy, the patients being less than one year of age.

Epstein employs a No. 8 or a No. 10 Nélaton catheter for the tube, and warm water holding in solution a little benzoate of magnesium, the latter being resorted to chiefly when fermentation and decomposition products are present. If none of these conditions are present, ordinary water will usually suffice. The liquid employed should always be warmed. Others—as, for example, Lorez—use the ordinary English catheter, of the size known as No. 11 or No. 12. The question as to the variety of tube to be employed is a vital one, since a poorly-devised apparatus not only gives no relief, but disgusts both the patient and the physician with the technique of the method. The tube should be more like a hollow bougie than like a catheter, in order that its calibre may be great enough to carry off some of the semi-solid matters present. If this rule is not carried out two evil results follow. In the first place, the tube and its apertures rapidly, or even at once, become clogged; secondly, the liquid is drained away, leaving behind a mass which is semi-solid, to be sure, and less bulky, but which is, nevertheless, the quintessence of the nastiness of fermentation, and quite as qualified to leaven any fresh food on its entrance as the liquid would be.

The holes in the gastric end of the tube should therefore be large enough to take in fairly large masses. In some cases the ordinary siphon may be used, but where there is any solid food or resistance, suction by means of a stomach-pump is necessary.

The tube should be, for a child, twenty-four or thirty inches in length. The methods by which lavage is employed, further than those we have named, are as follows: The catheter or tube should be passed backward against the roof of the mouth, so that by following the curve of the hard and soft palates it is directed into the pharynx and œsophagus, and then by gentle pressure forced on down into the stomach. The irritability of the pharynx rapidly disappears, and it is surprising how quickly the patient may become accustomed to the operation, and submit to it without any feeling of discomfort. After the tube has reached the stomach, a small funnel is to be fitted in its external end, which is then held above the head of the patient while water prepared in the way we have mentioned is poured into it until the stomach is filled, when the funnel end is lowered and the stomach is emptied by siphonage.

The stomach-pump has one very serious disadvantage, which is present with even more force in the case of a child than in the adult, namely, the danger of injury to the coats of the organ. This apparatus is also more costly and cumbersome, and for children the siphon is powerful enough in its action to take away all excuse for the use of the more complicated apparatus unless the contents of the stomach are in bulk.

It is particularly necessary in children, on account of the lack of intelligent aid and their liability to gulp, that every care should be taken that the tube does not slip entirely out of reach into the stomach, and for the prevention of this danger a string should be attached to the external end of the tube before it is introduced, and the tube should always be at least thirty inches in length.

The treatment of dilatation, to be considered after lavage, is dietetic. There can be no doubt that one of the chief reasons for the emaciation which comes on is the failure on the part of the stomach to digest and assimilate nourishment. In addition to this, the intestine is really the place for absorption of food to take place, and the delay of the food in the stomach virtually makes the chyme unfit for the function of the small intestine.

The foods to be given are, of course, to be in the highest degree capable of ready assimilation, and should be confined, especially in severe cases, to the materials which we can readily predigest by the employment of the digestive ferments now so largely sold. Carefully-skimmed milk is valuable, aside from its inherent usefulness, in that it lacks the fats which can be utilized only in the intestines, and which simply break down and decompose if kept in the stomach. Oyster broth, carefully freed from any oily matters in cooking, and thoroughly pancreatized, is to be given.

Rectal alimentation to some degree is always useful, particularly in older children, and Ewald, of Berlin, suggests the following nutrient enema: Beat up two eggs with a tablespoonful of cold water; to this add a little starch, boiled in half a cupful of a twenty-per-cent solution of grape-sugar and a wineglassful of red wine. The solution is to be well mixed at a temperature not high enough to coagulate the albumin, and injected as high up into the bowel as possible. For a child this mixture should be somewhat less in quantity than that given above for the adult, particularly as to the wine.

An exceedingly important part of the dietetic treatment of gastric dilatation consists in the constant bearing in mind of the fact that the tendency of food is to accumulate, and the avoidance of the pernicious habit of adding solids or liquids to the quantity of ingesta still remaining from a previous meal. If the child is old enough, all the remains of previous feedings should be removed by lavage before anything more is given, since otherwise the sweet food is at once contaminated by the liquids which it meets in the stomach.

The medicinal treatment of gastric ectasy is, unfortunately, very limited, so far as the stomach itself is concerned, and, indeed, we doubt whether any direct medication can ever be of much value unless in the form of disinfectant substances, such as we have spoken of in studying lavage, and these only prevent decomposition of the food and do not effect a cure.

In a case of marked gastric dilatation we should, nevertheless, always resort to the bitter tonics, such as gentian or calumba, and for the improvement of the muscular coats of the viscus employ the tincture or extract of physostigma in the dose of respectively 5 to 10 drops or $\frac{1}{8}$ to $\frac{1}{4}$ of a grain.

GASTRIC ULCER.[1]

In the treatment of gastric ulcer the general health and the use of those foods which will conduce to health and strength and at the same time not interfere too greatly with the stomach are to be attended to.

In the way of drugs internally we would recommend the alkalies and bismuth, or small doses of opium. Nitrate of silver in small amounts, frequently repeated, combined with belladonna or opium is of great value in all such cases, and should be persistently employed in some such manner as follows:

℞.—Argenti nitrat. . . . . gr. iv.
Ext. hyoscyami . . . . . . gr. x. to xx.
M.—Ft. in pil. No. xx. S. One t. d., a half hour before meals.

Counter-irritation should be applied to the belly for the relief of the pain and tenderness, to remove the local congestion and affect the morbid process favorably. This counter-irritation, in our opinion, should be of the mild continuous type rather than of the severe and fleeting character, and for this purpose the ordinary spice plaster, made of pepper, cinnamon, allspice, and cloves, may be employed. In the collapse following hæmorrhage or perforation into the abdominal cavity cardiac stimulants should be carefully and guardedly administered, lest by an excessive action they increase the hæmorrhage, while for the direct resuscitation of the patient external heat and rubbing of the extremities should be resorted to. Bordeaux wine, preferably of considerable age, should be employed as a stimulant if the use of alcohol is to be kept up for any time. In the early stages of the collapse the alcohol should be hot and fairly concentrated. If the patient is conscious small pieces of ice may be swallowed to control the hæmorrhage, and ergot may be given with the same object in view.

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[1] See article by author in Keating's Cyclopædia of Diseases of Children, vol. iii.

The vomiting should be stopped, since it may increase the hæmorrhage, and for this purpose the usual remedies are to be employed, including both those which act centrically and those which act peripherally. Bromide of sodium in weak solution may be injected into the rectum for this purpose in the following form :

℞.—Sodii bromidi		ʒss. to j.
Tr. opii		f℥j.
Aq.	q. s.	f℥iv. to vj.

M.—S. Inject into rectum.

In regard to the diet it should be light and easily assimilated, and should be one whose chief digestion and assimilation will be intestinal, not gastric, since by this means we largely avoid the exposure of the raw surface of the ulcer to the acid gastric juices. In some cases the patient should be fed only by the rectum, by means of artificially digested food, which is also very useful when given by the stomach.

GASTRITIS, ACUTE.

This is generally due to the ingestion of irritant foods or drinks, rarely arising in its true, acute form from other causes.

The *treatment* is to be directed entirely to the prevention of the spread of the inflammation and to the relief of that already developed. If the patient is seen soon after the onset of the trouble, the stomach is to be emptied of all irritant substances by means of vomiting induced by large draughts of warm water, or, better still, by the use of the stomach-pump, as the retching may increase the irritation. Mucilaginous drinks are to be given freely, and albuminous materials seem especially useful. Oils and similar protective liquids aid in preventing further damage. Opium, to allay pain and the local and systemic irritation, is invaluable. It should always be given in liquid form, and the deodorized tincture is the best in this respect, owing to its freedom from narcotine. Paregoric contains too little opium to be of value, and is irritating because of its volatile oil. If the stomach will bear no drugs they should be given by the rectum. If evidences of collapse appear, hot applications, atropine, or belladonna should be exhibited. It is important that the heat should be applied over the epigastrium and chest, and a flaxseed poultice is the best method of doing this.

GASTRO-ENTERITIS.

Gastro-enteritis is a condition of inflammation affecting the entire alimentary canal in some instances, and commonly produced by the ingestion of some irritant substance, either in the form of bad food, poisons, or mechanical irritants, such as grape seeds or cherry stones. The symptoms accompanying it are exceedingly various, but consist chiefly in pain of a griping character with watery or mucous stools, or, if the inflammation be very severe, absolute and unyielding constipation may be present. The nervous symptoms depend upon the degree of irritation and the general nervous tendency of the patient, and, if the trouble is very severe, may go on into shock or collapse.

If the irritation is very intense exfoliation of the mucous membrane may take place, the epithelium coming away in shreds.

The treatment of gastro-enteritis depends upon its severity and cause. Almost always we first allay the pain and tendency to inflammation by the hypodermic use of morphine, and immediately follow this or precede it by an emetic of a non-irritating and rapidly acting type, such as apomorphine, provided there is reason to believe that the poison or food still remains in whole or in part in the stomach. Following this, or in place of it, if emetics are not useful because the poison has already passed through the pylorus, castor oil in the dose of 2 to 3 tablespoonfuls to an adult may be given to sweep out the offending materials and lubricate the intestinal walls. In other cases sulphate of magnesium may be used but not sulphate of sodium or Rochelle salt, as they are both irritant. Having gotten rid of all offending materials opium and sulphuric acid are to be freely used to allay irritation and control diarrhœa (see Diarrhœa), and hot compresses are to be applied to the belly, or a spice or mustard plaster used instead. Vomiting when excessive is to be treated in the manner described under that head.

GLAUCOMA.

Glaucoma, or that disease dependent upon an increase of intraocular pressure, appears in an acute or chronic form. The disease in general terms is characterized by halos appearing about the gas-light; periods of obscuration of sight; shrinking of the nasal half of the field of vision; narrowing of the anterior chamber of the eye; anæsthesia of the cornea; and increased tension of the eyeball. In the "glaucomatous attack," or acute glaucoma, the injection of the eyeball is intense; the lids swell, there is photophobia, the cornea is steamy, the pupil *dilated* and motionless, and the vision rapidly destroyed. The case may be mistaken for iritis or acute ophthalmia —a fatal blunder.

Iridectomy or an equivalent measure is the only treatment for glaucoma. If for any reason this is delayed, a solution of the sulphate of eserine should be dropped into the eye (gr. 1 to 2 to the ounce) every two or three hours until relief follows. *Atropine must not be employed.* Hot compresses, opiates, and leeches are also useful to alleviate the pain, if for any reason operation is delayed.

GONORRHŒA.

The therapeutics of urethritis varies in accordance with whether the disease is acute or chronic, and is very greatly modified by the seat of inflammation; a posterior urethritis, for anatomical and mechanical reasons, not being amenable to the same treatment which will prove successful when the disease invades the penile portion of the urethra.

The membranous and prostatic portions of the urethra constitute its posterior part. They are surrounded by layers of powerful muscles which keep the canal constantly occluded, and which play the part of vesical sphincters. Hence, any injection forced into the urethra passes to but not beyond its membranous part, and is worse than useless if administered with the intention of combating inflammation of the posterior urethra.

Since the general acceptance of the gonococcus as a specific cause of gonorrhœa the treatment of acute anterior urethritis has been mainly antiseptic, those drugs being chosen which are found to act most powerfully upon the specific germs and at the same time produce the least irritant action upon the mucous membrane. Bichloride of mercury, as representing the most powerful germicide known to medicine, has been used most extensively. The main objection to its action lies in the fact that when employed in efficient strength it is exceedingly irritating. This effect may, to an extent, be avoided by using a large quantity in dilute solution, and one of the most satisfactory treatments yet advocated consists in thoroughly and repeatedly flushing the urethra with bichloride lotion 1 to 20,000 or 1 to 40,000. This may be accomplished by means of a bulbous catheter provided with numerous small apertures opening backward, just behind the enlarged extremity; immediately after urination the bulb is carried to the membranous portion of the urethra, the tube from an irrigator is then attached to the extremity of the catheter, and one or two pints of dilute mercury solution, as hot as can be borne, are injected. This may be repeated once or twice daily. When the urethra is so sensitive that the passage of an instrument is not practicable, a conical nozzle carrying a supply and a drainage-pipe, and of a size to close the meatus entirely when inserted, may be employed for irrigation. The drainage-pipe should be of slightly smaller calibre than that which carries the solution into the urethra. This insures the passage of the injection back as far as the membranous portion of the urethra, beyond which it will not pass if the pressure does not exceed that obtained by elevating the irrigator two feet above the level of the urethra. When neither of these methods of irrigation can be practised a syringe with a conical nozzle and with a capacity of at least one ounce may be employed; this should be used six or eight times a day, two syringefuls of the dilute lotion being injected immediately after urination. The liquid should be forced in very gently, being allowed to flow out by slightly lessening the pressure of the nozzle upon the meatus when the anterior urethra is full. When large injections are attempted by the ordinary small urethral syringe, the frequent application of the latter to the meatus occasions much irritation. As a precaution against forcing the injection into the posterior urethra the patient may be instructed to sit with the weight of the body bearing upon a folded towel placed beneath the perineum. These copious irrigations inaugurated in the earliest stage of gonorrhœa are frequently successful in producing a complete cure in a few days.

Much stronger solutions of mercury are frequently employed, the concentration depending upon the subjective sensations of the patient and varying from 1 : 1000 to 1 : 4000.

The addition of other antiseptic agents to the mercury solution has been found advantageous. A favorite prescription of Dr. J. William White is:

℞.—Hydrarg. chlor. corros.		gr. ij. to iv.
Zinc sulpho-carbolat.		gr. ij. to x.
Acid. boric.		ʒj.
Hydrogen peroxide		f℥j.
Aquæ	q.s.	f℥viij.

The strength of this should be varied to suit the individual.

Any of these ingredients may be used alone or in combination. Either individually or together, they probably represent the most efficient topical medication which modern treatment has approved. Where the gonorrhœa has already assumed a markedly inflammatory type, with swelling and œdema of the penis, redness and eversion of the meatus, and great sensitiveness of the urethra, no injection should be employed. The penis should be wrapped in cloths kept wet with alcohol and water, or lead-water and laudanum. With the subsidence of acute inflammatory symptoms and the appearance of copious discharge, the injection treatment may be inaugurated. It must be remembered that injections may in themselves prevent the discharge from entirely disappearing. Hence, as the symptoms ameliorate, the injection should be made less frequently; finally being entirely omitted for some days if the discharge seems to continue longer than usual.

Internal medication and constitutional treatment are most impor-

The injection most employed is the following: Nitrate of silver, grain ¼ to 1; distilled water, ℥j. Carbolic acid, 1 grain to the ounce, or any of the injections used in anterior urethritis, may also be used. These injections should be made twice a week.

Chronic Gonorrhœa.

Chronic gonorrhœa differs from the acute form in the fact that the inflammation is distinctly localized in certain portions of the urethra and does not invade the whole canal with uniform intensity; hence, efficient treatment must be directed not to the whole urethra but to the diseased areas. Foci of chronic urethritis are usually found either in the bulbous portion of the urethra or in the membranous or prostatic portions. If the disease is located in the anterior urethra it will commonly be found to depend upon the existence of a stricture of large calibre. The passage of sounds of full size, cutting the meatus if this is necessary for their introduction, will, in such cases, be followed by prompt relief. The sounds should be used not more frequently than twice a week, and should be most carefully sterilized before introduction.

If after free dilatation the discharge still persists, and a large portion of the anterior urethra is in a catarrhal condition, as shown by examination of the urine, irrigation of the urethra should be practised. This may be best effected by passing a soft rubber catheter down to the membranous portion of the urethra and injecting through it once daily 3 ounces of a half-grain-to-the-ounce solution of nitrate of silver. When the general catarrhal condition is materially modified, by means of an ordinary hard-rubber endoscope and a head mirror the focus of inflammation may be exposed, and may be treated directly by strong astringent solutions carried in by means of a brush or by absorbent cotton secured to the extremity of a long applicator. Nitrate of silver or sulphate of copper, twenty grains to the ounce, may be employed. Unna has devised a most successful treatment for obstinate cases of gonorrhœa. He advises coating the sounds with the following mixture:

℞.—Ol. cocæ	℥iij.
Ceræ flav.	ʒss.
Argent. nit.	gr. xv.
Bals. Peruvian	ʒss.

This is liquefied in a water-bath, the sounds are dipped in it and are then hung up to dry. On being passed the heat of the body melts the coating. The objection to their use lies in the fact that the application is made to the entire urethra. Practically, however, their employment is often followed by brilliant results.

Chronic posterior urethritis must be treated by remedies applied directly to the diseased area. Nitrate of silver is more commonly successful than any other medication. By means of Ultzmann's apparatus three or four drops of a solution varying in strength from 0.1 per cent. to 5 per cent. may be employed.

Finger recommends the following ointment:

℞.—Argent. nit. or cupri sulph.	gr. xv.
Lanolin	℥iij.
Ol. olivæ	ʒjss.

By means of an ordinary catheter, which is first filled then introduced until its eye reaches the prostatic portion of the urethra, a definite quantity of the ointment can be forced into the canal by a graduated rod.

In many cases pressure will exert a curative action, causing prompt absorption of inflammatory effusion. To accomplish this result large sounds may be passed into the bladder. Frequently the therapeutic influences of cold together with pressure are found beneficial. The best means of combining these two remedies is found in the psychrophor, an instrument in the shape of a sound but so arranged that a stream of water flows through its interior.

It must be borne in mind that chronic gonorrhœa is commonly due to unskilful or not sufficiently prolonged treatment of the acute stages. Not only should the treatment of acute gonorrhœa be continued until the gonococci have entirely vanished, but for fully two weeks after the disappearance of all symptoms of inflammation. The same rule holds good in regard to the chronic manifestations of the disease. Only after careful examination of the urine fails to show any sign of inflammatory trouble for at least two weeks should the treatment be suspended, and this should not take place suddenly, the intervals between the applications being gradually increased, the patient being carefully watched in the meantime.

Per contra, it must not be forgotten that long-continued irritant treatment may in itself indefinitely prolong a urethral discharge. Hence it is wise to suspend all injections in certain cases, and to examine the discharge carefully, as found in the urine, to determine whether or not the continuance of symptoms is dependent upon this cause.

There is a mucous secretion which quite frequently follows gonorrhœa but which is in no way dependent upon the persistence of this disease. Microscopic examination will at once determine its nature. It is probably most rapidly cured by attention to general hygiene and by tonic and supporting treatment.

Complications of Gonorrhœa.

Among the many local and general complications which may occur in the course of an acute or subacute gonorrhœa are balanitis, balano-posthitis, prostatitis, and epididymitis.

Balanitis and balano-posthitis are treated by perfect cleanliness. The discharge must be thoroughly washed out, the surface must be dried and must be isolated. The thorough cleansing of the parts is best accomplished by weak astringent solutions, such as the chloride of zinc, 4 grains to the ounce, 1 per cent. boric acid, or 1.5 per cent. carbolic acid; nitrate of silver is particularly valuable, if used in the form of a wash or injection 1 grain to the ounce will be found sufficiently strong. The superficial ulcerations may be further touched with the solid stick of the nitrate of silver. The prepuce having been retracted and the parts having been thoroughly washed, dusting powder, such as tannin or oxide of zinc, is distributed over the surface of the inflamed parts; the glans is then covered with a thin layer of absorbent cotton, and the prepuce is drawn forward. This dressing is to be repeated three times daily.

If the phimosis is so tight that the prepuce cannot be retracted, cleansing astringent injections and wrapping the penis in one or two thicknesses of gauze or other thin fabric, constantly kept wet with dilute lead-water, will be the treatment indicated. If, in spite of this treatment, inflammatory symptoms become more marked, circumcision is indicated.

Prostatitis rarely develops before the second or third week of urethritis. Where the acute symptoms are fairly developed direct local treatment is of little avail. Rest in bed, light diet, careful regulation of the bowels, medication to render the urine bland and unirritating, elevation of the pelvis, local depletion by means of leeches applied to the perineum, and the administration of morphine and belladonna, either by means of suppository or by hypodermic injection, represent the general treatment of all inflammatory conditions at or about the neck of the bladder. In the great majority of cases prostatitis undergoes prompt resolution, and this is more powerfully influenced by rectal injections than by any other method of treatment. For this purpose a two-way rectal tube must be employed, the nozzle of which is directed against the projection of the prostate into the bowel. From 2 to 4 quarts of water, either very cold or as hot as can be borne, are allowed to flow into the rectum by gravity this arrangement of the tubes allowing the injection to flow out as rapidly as it flows in. This treatment should be repeated three or four times a day. When, in spite of careful treatment and the free use of anodynes and antispasmodics, there is retention of urine, a soft catheter should be passed into the bladder and allowed to remain there.

If general and local symptoms denote abscess formation, the pus should be evacuated by perineal incision as soon as its presence is positively determined upon. It is true that the pus collection usually is spontaneously discharged into the urethra, but this result cannot certainly be depended upon, and, at best, is an unsatisfactory termination of the trouble. When the inflammation runs into a chronic type the treatment suitable for chronic posterior urethritis is indicated, namely, the use of large, cold, steel sounds and local applications to the prostatic urethra. In addition rectal injections, by means of the two-way tube, are very efficient in producing a cure.

Epididymitis requires rest in bed, cessation of all local treatment directed against the gonorrhœa, the elevation of the pelvis and testicles, and the systemic treatment applicable to acute inflammation. The general tendency of this complication of gonorrhœa is toward spontaneous resolution. The testicles may be supported by a handkerchief bandage, the base of which is passed beneath the scrotum while the ends and apex are secured in front to a circular band passing about the waist. To combat the agonizing pain and hasten the cure punctures have been advised. These, by relieving tension, promptly alleviate the suffering. Ice-bags may also be applied, though it is claimed that as a result of this treatment there remains an obstinate induration of the epididymis. Local applications of the nitrate of silver and of tincture of iodine are also said to act beneficially.

Since it is usually impossible for a patient suffering from gonorrhœal epididymitis to keep to his bed, a treatment must be advised which will allow him to attend to his business and at the same time will prevent the inflammation from becoming aggravated. The part must be splinted; if at the same time uniform pressure can be applied the cause of the trouble will be still further favorably modified. These indications are complied with, partially at least, by strapping the injured testicle. For this a number of adhesive resin strips, each half an inch wide and long enough to pass three-fourths around the swelled testicle are cut. The first strip encircles the scrotum between the affected testicle and the body, tightly imprisoning the former in a pouch of skin. The succeeding strips are then placed each overlapping the other in such a manner that the entire pouch is covered in, and a handkerchief bandage, applied as described above, may then be used to elevate the testicle. A better means of securing rest and pressure and at the same time exerting the resolvent influences of heat and moisture, is offered in the dressing proposed by Horand-Langlebert. The entire scrotum is first enveloped in a thick layer of cotton; over this is placed a piece of rubber-dam sufficiently large to cover in the cotton, and the dressing is completed by an ordinary suspensory, gored at the sides and provided with tapes to allow of close fitting. Unless there be decided swelling of the spermatic cord this dressing usually allows the patient to attend to his business and is followed by as prompt resolution as though confinement to bed had been insisted upon. When the acute symptoms have disappeared attention must be directed to the removal of infiltration, which if it persists may be a cause of sterility. This is accomplished by the continuance of heat, moisture, and pressure; by local applications, such as iodine gr. iv in lanolin ℥j, or of equal parts of mercury ointment and belladonna ointment, and by the internal administration of iodide of potassium, 10 to 20 grains three times daily.

Gonorrhœa in the Female.

The symptoms of acute gonorrhœa in the female are usually so mild that the attention of the physician is rarely called to the disease until it has reached its chronic form and has invaded the uterus and its appendages. When, however, acute urethritis is found, the treatment both local and general is conducted on the same principles as when the disease attacks the male urethra. During the most acute stage no local treatment is advisable, subsequently injections can be made with the ordinary clap syringe, not more than a drachm and a half of the liquid being employed at a time. If the urethral discharge persists, the seats of the suppuration are readily found by the endoscope tubes and treated directly by applications of strong solutions of nitrate of silver or sulphate of copper. The results of treatment are commonly satisfactory.

Acute vaginitis is, in actual practice, not very frequently observed. In addition to the general treatment of inflammation, local treatment directed to cleansing thoroughly the inflamed surfaces of discharge and acting upon them by a strong antiseptic lotion, will be followed by a rapid cure. The patient is instructed to irrigate the vagina three times daily with two pints of bichloride of mercury solution, 1 to 4000, thrown in by means of a fountain syringe. For this fluid to reach every portion of the diseased mucous membrane, it is necessary that the patient should lie upon her back with the hips elevated. Before rising, a pledget of absorbent cotton is placed between the labia. During the most acute stage of vaginitis hot-water injections and prolonged hot sitz baths are indicated. In addition to the antiseptic irrigations which the patient is directed to make, the physician should every second day insert a speculum and paint every portion of the diseased mucous membrane with nitrate of silver solution, varying in strength from 4 to 40 grains to the ounce. The vagina should then be packed with tampons of absorbent cotton, which may be dusted with astringent medication.

Vulvitis corresponds to balanitis in the male and is treated in a similar manner. Cleanliness is the most essential point in securing a cure. The parts are thoroughly washed with weak antiseptic lotions, and the abraded mucous surfaces are kept from coming in contact by means of a layer of absorbent cotton, or a piece of lint soaked in dilute lead-water or other mild astringent solution.

GOUT.

Gout is a word used to signify a series of manifestations occurring chiefly in those who have led a lazy, sluggish life, and have lived on the fat of the land and partaken more frequently of alcoholic beverages than of water, or it occurs in persons who do not live in this way but whose ancestors will be found to have done so, and to have handed down to them the gouty taint or diathesis, or, once more, in those who have had poor food for a long time. Very few Americans have gout in its marked and characteristic forms, owing to the active life pursued and to the fact that the inhabitants of the Western Hemisphere drink large amounts of water, thereby continually dissolving any effete matters in the system and washing them away.

The importance of pure water in this state is therapeutically remarkable, and the so-called lithia waters depend for their value more upon their freedom from salts than their presence. When a patient goes to medicinal springs he simply acts as a sluice-way, and, by continually drinking water, washes out the kidneys and prevents deposits of calcareous matters throughout the body. In a gouty individual the liquids of the body may be said to be so overladen with salts that they deposit them wherever a spot is found which is easy of access, just as water laden with lime forms a deposit on the sides of its bed when a drought comes on, and dissolves and removes these formations when a freshet takes place. Very often, when such waters are not attainable, satisfactory results will be reached by ordinary distilled water, the insipid taste of which can be overcome by charging it with carbonic acid.

When an acute attack of gout comes on, it is generally situated, as is well known, in the joints of the big toe or other toes, but may involve any part of the body, even to the heart and the contents of the abdomen. By far the best remedy for the relief of the pain is morphine, which should be given hypodermically, some persons say as near the spot involved as possible. At the same time the best remedy for gout that we have, colchicum, should be freely given until the patient shows evidence of the full effect of the drug, as evidenced by gastro-intestinal discomfort or pain and slight laxity of the bowels. The drug should be used in the form of the wine of the root, not the seeds, in the dose of 20 drops at the start, and increased by one drop every four hours until relief is obtained or symptoms of poisoning appear as noted above. In using this drug it is important to remember that *retrocedent* gout is more apt to occur under its influence than in an attack where the drug is not used. That is to say, the inflammation in the great toe may suddenly disappear, only to break forth in a violent and almost always fatal entero-colitis, gastritis, cerebritis, or heart-failure. Any condition of intestinal irritation or diarrhœa predisposes to such a complication very commonly under the use of colchicum.

The local treatment of gout, when it is active, consists in the application of a number of much vaunted but frequently useless remedies. For hospital practice a very useful mixture is made by adding one part of bicarbonate of sodium to nine parts of linseed oil, and wrapping the joint involved in a piece of lint soaked with this concoction. In other cases collodion may be applied in one or two good coats, not more, with relief, and in still others oil of peppermint has been recommended. It is to be remembered, however, that the inflamed joints are not to be treated by depletion through leeches or bleeding, as by this means they ultimately become worse; or, in other words, the treatment of gouty inflamed joints is not identical with that of inflamed joints from other causes. When the pains of acute gout are very severe at night, potassium iodide, in the dose of 15 grains at four or five o'clock in the afternoon, will sometimes give relief; this drug should always be combined with colchicum if the disease is subacute or chronic.

In chronic gout, except during the acute exacerbations of the disease, colchicum is almost useless, but potassium iodide should be pushed to the point of iodism, if the trouble be painful. Here diet comes in for a great part of the treatment, and should consist of foods which are not fatty nor rich, but plain and nourishing. Milk and eggs, the white meat of chicken, and cooked fruits without sugar being added, are allowed, tea and coffee being used only in moderation. If any wine is taken, it must be followed by copious draughts of pure water, and this last article should be used *ad libitum*. On the other hand, pastries, and, more than all, sweet wine, are the worst things that such a patient can take, and must be absolutely prohibited.

The insomnia of chronic or subacute gout is best put aside by potassium bromide and chloral, the former drug being the safest and best.

The local treatment of chronic gout consists in the application of flying blisters at a little distance from the suffering joint every few days. Where the deposit around the joints is very great and the normal movements are impossible, relief is often obtained by the application of a solution of citrate or carbonate of lithia, 5 to 10 grains to the ounce of water, on lint around the parts. Where the skin is broken and will not heal, this treatment often permits healing by dissolving the crystals in the wound which prevent the approximation of the edges and so cause irritation. Iodine ointment or the tincture of iodine is often placed around chronic gouty joints with advantage.

A standard remedy in subacute or chronic gout is arsenic, and its administration in the form of 3 drops of Fowler's solution, either with perfectly pure or lithiated water, is always to be resorted to. If anæmia is present arsenic is particularly indicated, and cod-liver oil and syrup of the iodide of iron are also of value in this state.

We find, therefore, in conclusion, that the use of large amounts of pure water devoid of salts, colchicum, potassium iodide, and arsenic are the greater points about which the rest of our treatment should centre. In those cases where retrocedent gout comes on, the heart must be supported by stimulants, particularly by hypodermic injections of ether until the slower drugs can act, by heat over the belly, by the use of opium to allay irritation, except where the brain and kidneys are seriously affected, and by the use of diuretics and alkaline drinks, and finally by counter-irritation in the shape of a mustard plaster placed over the abdomen or chest as the case may be.

GRANULAR LIDS.

This disease may be divided into acute and chronic granulations. In the former astringents and caustics are inadvisable, the eyes requiring weak antiseptic solutions like boric acid or salicylic acid, and the instillation of atropine. Leeches to the temple will aid in reducing the inflammatory reaction. In the chronic disease the object of treatment is to bring about absorption of the granulations which are its characteristic lesion, not by an application so caustic as to destroy the mucous membrane around them, but of sufficient vigor to produce healthy reaction. The following applications comprise those which have been employed with the greatest success: 10 grain solution of nitrate of silver, if there is discharge, applied once a day with neutralization of the excess; sulphate of copper in the form of a crystal carefully applied to the everted lids and the retrotarsal folds; pure carbolic acid applied with a camel's-hair pencil and the excess washed away with water; glycerole of tannin (tannic acid gr. 30, glycerin 1 oz.) best applied with a cotton applicator; boro-glyceride from 20 to 50 per cent., according to the vigor of the granulations. Strong solutions of corrosive sublimate are employed in the following manner: solutions of the strength of 2 to 200 or 1 to 500 are painted on the everted lids every second day, the pain of the application being alleviated by the previous instillation of cocaine, while three times daily the eyes are irrigated thoroughly with a solution of the mercury salt 1 to 7000. The surgical means which are employed to destroy the granulations are scarification of the conjunctiva, an inadvisable method; excision of the granulations, useful if these exist in isolated groups; crushing the granulations with specially devised forceps, a method often followed by satisfactory results; and excision of the fornix conjunctiva. In long-standing cases associated with inveterate pannus, de Wecker has proposed the use of an infusion of jequirity (3 per cent.). This produces an intense membranous conjunctivitis, which must be treated by iced compresses or similar measures to reduce its reaction, but when it has subsided the pannus is often relieved. This method has not been employed in recent times to the extent that it was practised when first introduced.

HEADACHE.

(For Neuralgic Headaches, see Neuralgia. For Bilious Headache, see Biliousness.)

Probably no single source of pain compares in its frequency to headache, chiefly because it is essentially a mere symptom of a disease and nothing more. It may arise from eye-strain, from brain disease, from anæmia, from plethora, from nervous breakdown, and from a multitude of causes which, if they were all recounted, would cover many pages of this book. The only forms of headache which will be considered here are those due to congestion or from fatigue.

Congestive headaches, dependent upon an engorgement of the cerebral vessels with blood, are to be treated in a number of ways, and if any direct cause can be discovered this must of course be removed. So far as the direct application of drugs is concerned we find two methods of promoting a cure. The first consists in the use of ergot, which will cause contraction of the dilated vessels, the second in the employment of vascular sedatives which will produce arterial depression and so remove congestion. Sometimes one of these methods will succeed where the other fails, and it is almost impossible to tell, beforehand, which case should have one drug and which another. It is to be remembered that when the congestion is due to vascular relaxation and weakness the vascular sedatives are contra-indicated.

The use of a hot mustard foot-bath is of great value, and a mustard plaster or cup applied to the nape of the neck is often of service in congestive headaches.

Where headache depends upon fatigue, either general or local, stimulating treatment is necessary. If eye-strain be the cause, full doses of strychnine or nux vomica are of service, and in many instances a combination of caffeine, bromide of sodium, and antipyrine is very successful, as follows:

℞.—Caffeine citrat.	gr. xl.
Sod. bromid.	ʒiv.
Antipyrine	ʒij.

M.—Ft. in chart. No. xx. S. One powder in water as needed.

Sometimes the caffeine makes the headache more acute, and if this occurs only the antipyrine can be used.

Sleep is generally a more useful prescription than any drug, and if business creates so much mental anxiety during the day as to be wearing upon the nervous system, or make the patient wakeful at night, business must be put aside and health and recreation sought after at a watering-place. Horseback exercise is very useful indeed, and should be resorted to by all who can afford it if they are sufferers from nervous headaches.

HEART DISEASE.

(*For Treatment of Angina Pectoris, see p.* 347.)

The writer classifies all forms of heart disease under this heading advisedly. In valvular disease the profession are beginning to understand more and more that the mere destruction or laming of this valve or that has little to do with the treatment, although the ultimate result of the case is somewhat dependent upon these conditions. It matters not whether the leak in a valve be minute or huge, provided the heart can still do its work; the condition of cardiac muscle is the important factor in the question. If an *irreparable* leak exists in a pump the question is not can we cure that leak, but can we work the pump with enough force and rapidity to obtain all the water needed for the maintenance of life. Some physicians use heart tonics, such as digitalis, whenever they find a valve diseased, as if to mend the broken valve. Nothing can be more erroneous, for a valve once injured is never healed.

It should be an invariable rule with every physician in examining a patient with heart disease to determine whether or not the tissues of the body receive their normal blood-supply. If they do not, even though the leak is so small as to escape notice, digitalis is to be used; but even if the murmur heard on auscultation is as loud as that of a machine-shop and the tissues are not starved no remedy is needed.

Another very important point in regard to the treatment of cardiac disease in children, is the remembrance that the stunting of the body and the slowness of growth are not merely the result of heart trouble, whereby the tissues do not increase in size from lack of nourishment, but occurs for a special purpose. Supposing that a child of eight or nine years has scarlet fever or rheumatism, which leaves the cardiac valves impaired in function. For a few days, or hours at least, the question must arise in the heart: "Can I fill all the bloodvessels properly?" If it can supply the vessels the child lives, but is stunted because nature is wise enough to understand that the struggling heart has all it can do to supply even a stunted frame, and realizes which is the vital question in the case. Sometimes relief does not occur and the patient is made worse by digitalis, because the leak is increased as much as the normal flow.

In mitral obstruction the difficulty is that the blood cannot enter the ventricle with sufficient rapidity, and this part of the heart contracts *before* it is well filled. By the prolongation of diastole the blood is given sufficient time to enter, and the ventricle *is* filled, sending out into the system a large wave of blood when it contracts.

In aortic stenosis there is obstruction to the normal flow of blood out of the heart, and the digitalis is needed to increase the ventricular force so that it may overcome the difficulty.

In aortic regurgitation digitalis, by its stimulation of the heart, may cause a sufficient output of force to clear itself of the regurgitant flow, but in most cases the drug fails, because the prolongation of diastole gives so much more time for the blood to flow backward in the dilating ventricle. The cardiac remedies to be used in such cases are strophanthus, in the form of the tincture, dose 3 to 5 drops, adonidine, dose ¼ to ½ grain, or sparteine, ½ grain. These remedies may also be used in the other forms of cardiac disease where digitalis fails.

In cardiac dropsy digitalis and the other heart stimulants do good by raising blood pressure and pulse force. (See Dropsy, page 399.)

In cardiac palpitation dependent upon indigestion, this condition must be relieved by appropriate digestive remedies, but in that form of palpitation due to over-exertion or heart strain, digitalis is useful. Sometimes aconite or veratrum viride are very serviceable in palpitation if the cardiac condition is good, and iron is to be used if the irritability be due to anæmia. Tea, coffee, tobacco, and excessive venery are to be forbidden. Sometimes nux vomica does good by stimulating the heart and nervous system, and belladonna seems of great value where arhythmia is present. Ringer recommends the use of veratrine ointment over the præcordium in some of these cases.

In sudden cardiac failure, from weakness or poisons, the use of ether and ammonia is to be resorted to at once, and these are to be followed by alcohol and digitalis, if necessary. The ammonia is a direct heart stimulant, as is also the alcohol and ether.

Cardiac hypertrophy is rarely seen alone without some other lesion accompanying it, but it may occur from prolonged and excessive exercise or other cause. It is to be treated by aconite, veratrum viride, perfect rest, and avoidance of exercise, and in the use of moderate amounts of food of a non-stimulating character. Wines and coffee should be forbidden, and veratrine ointment placed over the heart.

Fatty heart occurs in two forms. That in which true fatty degeneration has taken place in the muscular fibre, and that in which there is a deposit of fat between the fibres. Nothing of any moment can be done for the first state, but much for the second. The patient suffering from this latter form of heart trouble is nearly always obese, and should suffer abstinence from fats and rich foods, from all sweet wines or malt liquors, from sugars and milk, and, at the same time, take exercise. At first this treatment may cause dyspnœa, but by increasing the severity of the exercise by a small amount daily great feats can generally be effected in the end, with marked improvement in the cardiac action.

HÆMORRHAGE.

(*Including Menorrhagia, Metrorrhagia, Hæmoptysis, Hæmatemesis, Intestinal Hæmorrhage, Hæmaturia, and Post-partum Hæmorrhage.*)

Under this heading will be taken up the consideration of all forms of hæmorrhage which can be controlled by drugs or measures not distinctly surgical in their scope, with the exception of epistaxis, which has already been spoken of.

Whenever a hæmorrhage can be arrested by the application of a ligature or compression, as in a cut finger or some similar wound, no styptic should be used. Styptics are employed for the double purpose of constringing the tissues and coagulating the blood, and, in consequence, form coagula which make a nasty septic mass about the wound. In their place the physician should resort to a compress soaked in some antiseptic liquid, or filled with disinfectant powder, and if this fails to control the bleeding then ligation of the bleeding vessel becomes necessary.

Where the bleeding point cannot be reached by direct compression or for ligation, the use of packing and of astringents is advisable, and drugs which are anti-hæmorrhagic should be used by the mouth. As these forms of hæmorrhage are generally given separate names, they will be so considered.

Menorrhagia is an excessive flow of menstrual blood, either excessive in quantity during two or three days, or prolonging itself over an unusual number of days, while *metrorrhagia* is a state in which bleeding takes place from the uterus independent of menstruation and at any period of the month, or even after the menopause has occurred.

Menorrhagia or excessive menstruation is not to be judged by the amount of the flow but by the question as to whether the loss is sufficient to cause decrease of health or to indicate disease. In some cases it is a means of relieving plethora.

When the physician decides that something should be done to remedy the condition of the patient, either in menorrhagia or metrorrhagia it will be necessary for him to find out whether any polypi or other form of uterine disease is directly responsible for the trouble, and in the meantime to employ drugs known to act favorably upon uterine hæmorrhage. The most prominent of these drugs are ergot and oil of erigeron, the first being more active and the best remedy for active bleeding, the second the better for oozing and the presence of a continual "show."

The fluid extract of ergot may be given in varying dose, from 10 to 60 drops according to the necessities of the case, and the oil of erigeron in capsules in the dose of from 3 to 5 minims, or if capsules cannot be had the physician must employ the oil in an emulsion made by using syrup of acacia or other similar substance.

Where menstruation is irregular and the menorrhagia is almost a metrorrhagia, bromide of potassium or sodium in the dose of 10 grains once or twice a day is often very serviceable indeed, and the distilled extract of hamamelis in the dose of 1 drachm three times a day is almost as useful. Cannabis indica, if an active sample is obtainable, is also said to be of service, but the writer has never seen it used. Oil of cinnamon in the dose of ½ drachm is very efficacious in the slow oozing of some cases where erigeron cannot be used or obtained. Sometimes, where congestion of the pelvic viscera is the cause of the trouble dry cups over the sacrum give relief.

Hæmoptysis, or hæmorrhage from the lung, is nearly always due to tubercular ulceration of a small or large bloodvessel, and the life of the patient depends in reality more upon the rapidity with which a clot naturally forms, than upon any skill of the physician. Though textbooks order atomized solutions to be inhaled and other remedies to be taken by way of the lung, in most cases these measures will be found impracticable, simply because the nervousness of the patient and the constant cough will not permit of inhalations of any extent, and even if a full breath can be taken it generally increases the bleeding and coughing. The only occasions on which inhalations of styptics are of service are those in which the hæmorrhage is just beginning, or so slight as to streak the sputum or to be at least thoroughly mixed with it. The solutions to be so employed must be used in an atomizer which will throw a fine spray, sufficiently fine to enter the smallest air-tubes with the inspiratory wave of air. A very good fluid is one made from Monsel's solution as follows:

℞.—Liquor ferri subsulphat.	gtt xx to xxx.
Aq. dest.	f℥iv.

M.—S. Use in an atomizer every few minutes.

Or the following:[1]

℞.—Acid. tannic.	gr. xx.
Glycerin.	fʒij.
Aq. dest. q. s.	f℥iij.

M.—S. Use in atomizer.

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[1] If the Monsel does not stop the hæmorrhage, the tannic acid will probably fail, but more important still, the two should not be used together, as the tannate of iron is as black as ink.

Or,

℞.—Aluminis	gr. vj.
Aq. dest.	f℥iij.

M.—S. Use in an atomizer.

At the same time the patient should swallow, whether the hæmorrhage be acute or not, not less than 1 to 1½ drachms of the fluid extract of ergot, or a solution made by adding 20 grains of gallic acid to 1 ounce of water. To allay nervous excitement a hypodermic of morphine should be used.

Sometimes the patient can point directly to the spot where the hæmorrhage exists, and under these circumstances a dry cup or a piece of ice placed over this point will prove useful.

After an attack of hæmoptysis there is great danger in many cases of a traumatic pneumonia being set up by the presence of the extravasated blood. This should be combated by the use of a careful diet, the reduction of any arterial excitement, and by small doses of aconite in persons *not weakened by advanced disease or bleeding.* Perfect rest in bed is to be insisted on and no stimulants allowed in food or drink, unless the weakness of the patient requires it.

Hæmatemesis.—This depends either upon some injury to the stomach or much more commonly upon gastric ulcer, cancer, or some other severe form of gastric trouble, and is one of the easiest of the so-called "internal hæmorrhages" to treat, because by swallowing drugs they can act directly upon the bleeding surface.[1] In such a case small pieces of ice should be swallowed frequently, and this may be assisted by 3 drops of Monsel's solution in a half tumblerful of water every fifteen minutes. Tannic acid may be given instead in the dose of 20 grains to the drachm, but the two should never be given at once to the same case. (See foot-note on page 458.) Monsel's salt may be given in pill in the dose of 2 to 3 grains. The acetate of lead is also of value in pill form with morphine or opium in the dose of 2 to 3 grains. Tincture of the chloride of iron, the sulphate of iron, turpentine, ipecac, ergot, and hamamelis may all be used, the last three particularly in slow or passive hæmorrhages. Sometimes nitrate of silver in the dose of ¼ of a grain in pill form is of service if the hæmorrhage is slow.

Hæmorrhage from the bowel is to be treated according to its point of origin. If in the small intestine, as from ulceration of Peyer's patches or other glands, the medicines must be used by the mouth, if it be from the colon or rectum, or from hæmorrhoids, medication must be by way of the anus.

Hæmorrhage of the first class is best combated by the taking of small amounts of ice by the mouth, and by the use of Monsel's salt

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[1] Hæmatemesis also ensues as a result of swallowing blood which has escaped in the mouth or naso-pharynx, and is sometimes induced by malingerers in order to further their ends. These forms should, of course, be separated from those dependent upon some lesion in the stomach itself.

(Ferri subsulphatis). Three grains should be given every half hour or oftener, the pill being made hard enough to reach the intestine without being altered or decomposed in the stomach.

The use of ergot is wise and should always be resorted to, and tannic acid may be given in large amount in solution or pill with advantage if the Monsel's salt is not obtainable. The other remedies which are of service are sulphuric acid in the dose of 5 to 10 drops in water in acute or passive bleeding, or turpentine given in capsule, or better still in emulsion with acacia in the dose of 10 drops every half hour, particularly where the hæmorrhage is not active. Acetate of lead and camphor in the following pill may be of service in some cases:

℞.—Plumbi acetat.	gr. v.
Camphoræ	gr. x.

M. Ft. in pil. No. v.—S. One pill every hour.

Where the hæmorrhage is dependent upon ulceration of the colon or rectum, injections are to be resorted to. These are both styptic and curative, the styptic injections being particularly useful when the bleeding is to be stopped at once, the others where it is sought to remove the condition producing the trouble.

To the first class belong alum, sulphate of copper, Monsel's solution, sulphate of iron, tannic acid, and cold water. In the second we find nitrate of silver, the sulphates of copper and of iron, and the chlorate of potassium.

The alum solution used should be fairly strong, 10 grains to the ounce; the copper, 5 grains to the ounce; the Monsel's salt, 10 grains to the ounce; or, 1 drachm of the Monsel's solution to each 2 ounces. The tannic acid should be used in the strength of 20 grains to the ounce of water and glycerin. When chlorate of potassium is used it should be employed in saturated solution in small injections (25 grains to the ounce), or weaker if the injection be a large one (10 grains to the ounce).

These injections should be carefully given, and the success or failure attending the treatment of these states depends as much on the *technique* of the operation as upon the injection of the medicinal substance. It should never be forgotten that an injection designed for medication should be as small as circumstances will permit. Thus, in inflammation of the rectum the amount of the injected liquid should not be above 4 ounces at the utmost, and preferably 2 ounces unless the ulcer is high up. An enema is given in bulk so as to cause distention and excite the bowel to movement, whereas, from a medicinal injection no movement is desired. Again, the apparatus for sending in the fluid ought not to be a "family" or ordinary syringe but a fountain syringe, the pressure being hydrostatic. This may be dispensed with to be sure if the injection be small and only intended for the lower part of the rectum, but is indispensable if the injection be intended to reach the upper part of the colon. The entrance of the liquid should always be gradual and easy. If resistance is met with the pressure must be overcome, not by force, but by waiting a moment until it passes off. When the entire colon is to be flooded at least a gallon of warm liquid may be needed. In these cases those drugs which are capable of absorption and the production of poisonous symptoms, are not to be used except in small amounts.

Sometimes, in dysentery, the injection of a pint to a quart of ice-cold water has a most favorable effect upon bloody purging. Whenever a medicated injection is to be used, the entire tract which is to be invaded should be washed out with pure water or with a saline or soapy liquid, in order to clear out mucus and fæces which prevent the drugs from acting on the bowel wall.

Hæmaturia is a condition in which blood appears in the urine, and it may be divided into two classes, those in which the blood comes from the kidney or bladder, and those in which it comes from the urethra. In the first class the blood is always well mixed with the urine, which is changed in color from its decomposition, and appears either through the entire act of urination or just at the end of the act. In those instances in which the blood is in the first part of the stream it arises in the urethra, is nearly pure, and is not well mixed with the urine.

If the blood is due to the presence of an acute nephritis, the kidneys need treatment, and for directions as to this point the article on Acute Bright's Disease should be read; while, if it is due to the presence of a lesion in the bladder, the directions governing the use of turpentine, erigeron, or ergot, as given for menorrhagia and metrorrhagia, should be followed; or, if any morbid growth be present, it should be removed. Sometimes 10 to 20 grains of camphor in divided doses are of service, given in pill form, while in others cannabis indica is of value.

Gallic acid, in 20 grain doses, may be used, and is very valuable. If the hæmorrhage is alarming, injections of astringent washes, such as two to three grains of alum to the ounce of water, should be sent into the bladder. It must be remembered, however, that this simply fills the bladder with clots which are not readily passed and are liable to become septic.

A very useful prescription is:

℞.—Acid. gallic.		ʒj.
Acid. sulphuric. dil.		f℥ij.
Aquæ	q. s.	f℥iij.

M.—S. Teaspoonful in water every four hours.

If the hæmaturia be malarial, quinine should, of course, be employed.

Post-partum hæmorrhage is to be controlled by the use of friction and kneading or grasping the dilated uterus through the relaxed abdominal wall, by the use of drachm doses of the fluid extract of ergot or a wineglassful of the wine of ergot, and by the irritation of the uterine wall by passing the hand up through the vagina into the uterine cavity. Sometimes ice may be passed up the vagina and into the uterine cavity with success in stopping the bleeding, and even vinegar and lemon juice may be tried if the case is a desperate one. In other cases injections of water as hot as can be borne may be resorted to.

HÆMORRHOIDS.

These painful, annoying, and often serious, dilatations of the hæmorrhoidal veins about the rectal opening may be internal or external, bleeding or "blind." In nearly every instance where they are prominent and troublesome the only cure rests in operative measures for their relief; but, nevertheless, much can be done for the alleviation of the pain and discomfort produced by them. Constipation is nearly always an annoying symptom, and should be relieved by the proper diet (see Constipation), and by the use of sulphur or aloes. The latter drug has been highly praised and severely condemned by equally eminent observers. The author, however, is not favorable to its use. (For formulæ, see article on Constipation.)

In some cases the injection of a pint of cold water in the morning will relieve congestion and permit an easy evacuation of the bowels, or 10 to 20 grains of rhubarb root may be chewed each night before retiring. A very serviceable local application is hamamelis, either in the form of a lotion or injection (1 drachm to the ounce), and an ointment of gallic acid and opium is of value, made as follows:

℞.—Acid. gallic.	gr. x.
Ex. opii	gr. iv.
Ext. belladon.	gr. iv.
Ung. simplicis.	ʒ iv.

M.—S. Apply night and morning.

For the surgical treatment of piles reference must be made to surgical works.

HEPATITIS.

(*Acute and Chronic Hepatitis, and Hepatic Abscess.*)

Inflammation of the liver may be produced by many causes, such as injuries, cold, exposure to high heat, as in the tropics, syphilis, and the presence of any infectious disease or of parasites. It may also arise from alcoholism. The acute form is rarely produced by syphilis directly, unless by the presence of some other form of the disease, and the same may be said of the hepatitis of hot climates, which is generally subacute or chronic. The pain, swelling, and general symptoms of the acute form of inflammation of the liver are described thoroughly in the text-books. The measures commonly adopted for the relief of the symptoms and the disease itself are of two kinds. The first, medicinal; the second, dietetic.

The patient, if the attack be acute or severe, will commonly be found in bed from the pain and fever, but, if not, he must be placed in bed and kept in a recumbent posture. Over the surface of the right hypochondrium should be placed two cantharidal blisters of the diameter of from 1 to 3 inches, or, if this is not possible, a large mustard plaster is to be used. Sometimes hot cloths applied over this area not only give relief, but also aid in the formation of the blister. At the same time, if the bowels are greatly confined, a saline purgative may be given, and be preceded by 1 grain of calomel in fractional doses. In regard to internal medication the physician should recollect that hepatitis is, like every inflammation, a local hyperæmia or vascular engorgement, and, in consequence, that aconite, in full doses, is useful. Veratrum viride may be used, but as it may produce vomiting and disturb the liver it should rarely be employed. The kidneys may be kept active by spirit of nitrous ether and citrate of potassium, or by any one of the diuretic waters, such as Vichy. If the inflammation is not aborted by this treatment it will go on to hepatic abscess.[1] If hepatic abscess develops the best thing to be done is to aspirate and draw off the pus. Very frequently the inflamed organ will form so strong an attachment with the peritoneal coat of the abdominal cavity that a bistoury may be used to free the pus if an aspirator is not at hand. After pus is once formed any constitutional evidence of its presence as by night-sweats, hectic or rigors, is a sign for immediate interference by the physician with the purulent collection. If dysentery exists it must be cured as rapidly as possible.

The diet during the early stages of acute hepatitis and during its later stages is almost identical, and may be resorted to in the subacute and even in the chronic forms of the disease. It should consist of koumyss to a great extent, or matzoon may be employed, and "strong foods," such as meats of all kinds, particularly beef, pork, and mutton, are to be avoided sedulously. All spices in the food must be forbidden, and alcohol utterly tabooed. If koumyss cannot be had the patient may be fed on peptonized milk or pancreatized oysters. (See page 329.) After abscess develops the same recommendations are to be followed, and the diet is to be as supportive as possible, small doses of quinine being used.

In the treatment of the subacute or chronic hepatitis of hot climates no remedy compares to freshly prepared strong nitro-muriatic acid used both externally and internally. The acid should be dark-red, not orange colored, and be mixed with water only when about to be taken, in the dose of 3 to 4 drops three times a day. This remedy is contra-indicated in acute hepatitis, because it acts by stimulating the organ up to its normal position, and would only increase the acute form of the disease if administered at this time. Externally, it is to be used by mixing it with water and applying it by means of a flannel wrung out in the solution, or by placing it on spongiopiline in the following proportion: Take from 1 to 3 fluidrachms to the pint of warm water and apply over the liver, and if 3 fluidrachms irritates the skin too greatly, use the smaller quantity. This causes a tingling of the skin and a localized sweat.

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[1] Just here it may be recalled that many cases of hepatic abscess are now known to be due to dysentery, and that the diseased state of the lower bowel in this condition may infect the liver.

The hepatitis due to syphilis generally shows itself as a cirrhosis, and is to be treated by anti-syphilitic measures. (See Syphilis.)

If ascites from cirrhosis develops the liquid is to be withdrawn, and frequent withdrawals, as often as the liquid returns, have been known to result in final cure or arrest of the disease. In all forms of chronic hepatitis iodide of potassium is a useful remedy in the dose of from 5 to 10 grains three times a day, or larger amounts may be used if the case be specific.

HICCOUGH.

This is an affection depending upon irritability of the nerves supplying the diaphragm arising from many causes, such as gastric irritation, nervousness, uræmia, and as a complication of several exhausting diseases, such, for example, as typhoid fever.

The mechanism of its production rests upon the sudden contraction or descent of the diaphragm, whereby a vacuum is formed in the chest into which the outside air attempts to rush, but is prevented from doing so by a sudden closure of the glottis, the peculiar sound of the hiccough being thus developed. Generally the symptom stops of itself, but it may become excessive.

The remedies to be employed are used according to the cause of the condition. If there be gastric or intestinal irritability then the irritating matter must be removed by emetics or purges, and nervous and local sedatives used. A few drops of spirit of chloroform do good in many cases, and a little tincture of capsicum may be employed in other instances, say 2 to 3 drops well diluted, even for adults. Spirit of camphor, or the tincture of valerian, in the dose of 1 drachm may be serviceable, and Hoffmann's anodyne is peculiarly appropriate. In the hiccough of typhoid fever nothing compares to musk, 10 grains by the rectum, and, if this cannot be used, then oil of amber may be given in the dose of 5 to 10 drops in capsule or emulsion.

Where external remedies are resorted to, ether thrown in a fine spray on the epigastrium may stop an attack.

In cases where the affection comes on after meals, and is due to indigestion, a course of tonic treatment will often give relief. Thus nux vomica in pill or tincture, and accompanied by some dilute mineral acid, such as hydrochloric or nitric, may be employed.

If the symptom be due to uræmia, a hypodermic injection of muriate of pilocarpine will be found of service unless it is contra-indicated by advanced depression and weakness.

INCONTINENCE OF URINE.

Incontinence of urine may be classified either according to its forms or the methods of its treatment.

Four varieties may be recognized as occurring separately, although all of them may occur in one case. These are those cases where the bladder fails to hold the urine day or night, those in which the incontinence is only nocturnal, and those in which it occurs only upon some nervous start, or in which the sphincter becomes relaxed from general atony. The first of these occur in children, the latter instances in adult females. A fourth form of incontinence depends upon paralysis arising from centric nervous disorder or from paralysis due to retention and consequent paralytic distention.

Taking up the consideration of the first forms, namely, those occurring in children, in which the trouble is generally nocturnal, the complete history of the case and the present condition must be discovered. Many of the most obstinate cases will yield when the urine is made clear and mild by the use of alkalies, and others will recover upon the removal of worms from the vagina, which have crawled there from the rectum, or upon circumcision of a redundant prepuce, particularly if this be tight and smegma be found back of it in large quantity. The cause of the incontinence in both these conditions is reflex irritation, by the urine on the bladder walls or by irritation at the end of the penis, and the reason that alkalies do good is that they render the urine, which is concentrated and irritating, dilute, alkaline, and mild. The use of belladonna in these cases is rarely if ever curative, and is at most only palliative, the condition returning just as soon as the effects of the drug permit the irritation to be felt by the nerves of the bladder.

Where the urine is concentrated and dark in color, the following prescription is always useful:

℞.—Potas. citrat.		℥ss.
Spt. æther. nitros.		f℥vj.
Aq.	q. s.	f℥vj.

M.—S. Dessertspoonful every four hours in equal parts of water.

As the urine becomes clear, after several days, a few drops of tincture of belladonna may be added to the mixture; but if a little is not sufficient then it must not be increased, as belladonna will not cure the condition and will make the urine concentrated, a condition directly opposed to that which is wanted.

Sometimes these cases are dependent not so much upon vesical irritability as upon weakness of the spinal centres governing the bladder. If this be the case the remedies used should be directed to the improvement of these parts, and the following pill should be recommended, or the succeeding solution:

℞.—Acid. arseniosi	gr. ⅓.
Ext. nuc. vom.	gr. ij.

M.—Ft. in pil. No. xx. S. One t. d. after meals for a child of eight or ten years.

Or,

℞.—Liq. potas. arsenit.		gtt. xxiv.
Tinct. nuc. vom.		gtt. xvi.
Aq.	q. s.	f℥ iij.

M.—S. Teaspoonful t. d. after meals for a child of eight or ten years.

This is so bitter as to be exceedingly disagreeable and Fowler's solution may often be used alone in the dose of ½ to 1 drop.

It must be remembered that this last treatment is only to be employed in chronic cases devoid of all irritation and dependent upon atony. It will not do good if the urine is not previously made clear.

Nothing can be more unfortunate in the treatment of these cases than punishment by severe scolding and whippings, as they never do good, and the fault being beyond the child's control the unjust punishment makes him sullen, or through nervousness his trouble becomes worse. In some cases it may be necessary to let the child use diuretic waters for years to cure the habit, and the patient should always be taken up from bed when the parents retire for the night and made to evacuate the bladder.

In the incontinence of adult females or males, on laughing or sudden movement, nothing compares to drop doses of cantharides three times a day, the urine being kept flowing freely from the kidneys by means of alkaline diuretics.

The treatment of the fourth form of incontinence of urine comes into the province of surgery. The bladder must be relieved by the catheter if the trouble be from retention. If from paralysis nothing can be done, except to carry out those general measures valuable in such cases, and to maintain the urine in as normal a state as possible by frequent catheterization with an aseptic catheter and by washing out the bladder every few days or hours, as the case may be, with some weak antiseptic fluid such as 1 to 10,000 solution of bichloride of mercury, or 1 to 100 of carbolic acid.

INDIGESTION, GASTRIC AND INTESTINAL.

Under the heading "Biliousness" the writer has already described many of the conditions arising out of indigestion, and this being the case the consideration of that state known as dyspepsia or indigestion will only receive attention at this point in so far as its relief is concerned, without the relief of the symptoms produced.

Lack of *gastric* digestion depends for its existence upon a very great number of causes and is always a symptom, not a disease. It occurs during the course of prolonged or short fevers, from atony of the gastric walls and glands, from lack of secretion of the proper character, from hypersecretion of mucus by the mucous glands, and by fermentative changes in the food, or as the result of any one or all of these conditions, and lastly because the food is unsuitable to the case or is of a kind difficult of assimilation, or is readily split up into effete products by the juices of the organ. Sometimes it is due to organic changes in the viscus, as carcinoma or ulcer, and sometimes to acute or chronic gastritis. In each of these states the treatment is of course different.

The indigestion attendant upon the course of fevers can nearly always be avoided by a proper diet and the use of predigested food, such as pancreatized beef-tea, milk, or broths.

The necessity of this artificial digestion is the more readily recognized, when we recall the investigations of Hoppe-Seyler upon the quality of the gastric juice of a patient suffering from typhus fever, for he found that no hydrochloric acid was present. Uffelmann has also found in a similar study that the peptone-forming secretion of the stomach ceases entirely during fever.

Generally, if the disease is *adynamic*, alcohol should be taken with the food, so that the stimulating effect of the drug will cause gastric and intestinal activity. A very important point to be remembered, is that the exercise of the function known as digestion requires force, and that digestion fails in cases of fever because the system lacks the force required to carry out the act.[1] As alcohol adds force to the system it aids digestion, and should be varied in the amount given according to the state of the organism, and particularly of the stomach itself. During the stage of convalescence from fevers or other acute diseases the digestive functions are to be kept up to the mark by bitter tonics and a gradual decrease in the amount of alcohol insisted upon, lest the alcoholic habit be set up. The tonics may be given in the formulæ found on the next page if desired.

In the gastric atony dependent upon overwork or fatigue of mind, as well as body, tonics are to take the place of alcohol, which is peculiarly apt to give rise to the alcohol habit in such cases. These tonics are always bitter and depend for their activity upon this property. The most powerful of them are nux vomica, or its alkaloid strychnine, and quinine, both of which drugs, however, exercise a more powerful effect on other parts of the body than on the stomach. The other bitters are gentian, cardamoms, quassia, chiretta, and columbo, all of which may be used with great success in combination with one another or alone.

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[1] Very few of us realize the amount of force used up in the body in daily life. It is almost impossible to estimate the amount used in digestion, but we know that glandular secretion is very powerful, so powerful in the salivary glands as to be twice that of the blood-pressure in the carotid artery, if necessity requires it. (Ludwig.)

The following formulæ are useful, but before naming them it is proper to call attention to the fact that all tonics are contra-indicated if any irritation of the stomach is present, because they are stimulants and irritate the gastric walls all the more if these walls are already inflamed.

℞.—Ext. nuc. vom.	gr. iv.
Ext. quassiæ	gr. xx.
Quin. sulph.	gr. xl.

M.—Ft. in pil. No. xx. S. One pill t. d., after meals.

Or,

℞.—Tr. nuc. vom.		f℥j.
Tr. cinchon. comp.	q. s.	f℥iv.

M.—S. Teaspoonful after each meal.

Or,

℞.—Ext. chiratæ	gr. xl.
Ext. gentian.	gr. xl.
Oleoresin. capsici	♏v.

M.—Ft. in pil. No. xx. S. One after each meal.

Where the failure of digestion rests upon a deficient secretion and it is desired to increase the rapidity of the act by purely artificial means, we may rely upon pepsin and hydrochloric acid, but if this is done it should be resorted to with a clear idea of why they are prescribed.

Very commonly in the treatment of gastric dyspepsia proper, pepsin is given in such absurdly small doses as to be almost useless, and yet the prescription as it is taken is intended to aid the true gastric juice which is not thought strong enough to be capable of performing its functions aright. This is not by any means the result attained in the majority of cases, for the following reasons—indeed the direct digestive action of the dose administered probably brings about the smallest part of the good achieved :

It is a mistaken idea to believe that pepsin and hydrochloric acid are simultaneously secreted and utterly independent bodies, or, in other words, that the pepsin may be formed even if the glands fail to form the acid. We know, from the experiments of Heidenhain, and of Langley, as well as many others, that pepsin, as such, is not secreted by the glands ready formed, but that these tubules secrete a so-called "mother substance" called pepsinogen, which is absolutely impotent until it is changed into pepsin by the presence of hydrochloric acid or sodium chloride. Consequently, we learn that the two digestive elements are very closely associated, and that no acid means no pepsin.

In normal life this acid is derived by the splitting up of the chlorides in the blood supplying the glands by the lactic acid which is present almost constantly in the stomach, owing to the decomposition of carbo-hydrates. This assertion, made by Maly, is also confirmed to some extent by Julius Thomsen, who has shown that very weak acids may displace stronger ones from their bases, and even appropriate the greater part of the base. This is doubtless the reason why common salt is so useful a condiment, since it is broken up in the stomach, thus setting free hydrochloric acid, besides keeping up the alkalinity of the juices of the body which is so necessary to health and the future secretion of gastric juice. It also explains, in a very ingenious manner, the well-known fact that salt added to a glass of milk increases its digestibility to a great degree. Further than this the usefulness of the salt in small amount taken before meals does not depend entirely, as has been thought, upon an endeavor on the part of the stomach to neutralize the alkali present in a normally acid medium, whereby an excess of gastric juice is secreted, but upon the reasons given above. We find, therefore, that in cases where there is reason to believe that gastric digestion is imperfect, common salt should be used in increased amount in the food so that the quantity of hydrochloric acid may be increased. If, however, there is reason to believe that lactic acid is present in too small a quantity to split up this salt, then hydrochloric acid must itself be used, and, where it is employed, given freely in order not only to act thoroughly as far as its own functions are concerned, but also to perform an equally important function, namely, the conversion of pepsinogen into the active body pepsin. In other words, deficiency of pepsin in the juice is to be corrected, not by a prescription containing much pepsin and a little acid, but rather the reverse, for the pepsin in the prescription is after all an extraneous product, while the pepsin brought into being by the acid is a normal secretion. Of course the quantity of pepsin must depend on a normal formation of pepsinogen, but it should not be forgotten, on the other hand, that as pepsin acts by catalysis, and is a most powerful ferment, only very small quantities of it are absolutely necessary, while large amounts of hydrochloric acid, comparatively speaking, are essential.

Bourget has enunciated some thoughts which are so completely in accord with the views here expressed as to be worthy of quotation. He believes, as does the writer, that the hydrochloric acid is generally the secretion which is lacking in amount and recommends its free employment as the most important part of the treatment of gastric indigestion. He does not seem to do this, because he believes it to increase the pepsin, but only because he thinks the acid secretion is more apt to be deranged than is that of the ferment. According to practical experience, and the equally reliable information gained by experimental research, it is to be concluded, therefore, that pepsin is to occupy the least prominent position in a prescription for gastric disturbance, and that the acid is to be freely used.

Where indigestion results from the presence of gastric catarrh the remedies applicable to such a state must be resorted to. (See Gastric Catarrh.)

In many cases in which distress comes on some time after eating, the trouble is due to the development of large amounts of lactic and butyric acid in the stomach, and but one remedy can be given unless the patient will vomit himself by tickling his pharynx or swallowing an emetic. The remedy of a less violent character spoken of is ammonia. Sometimes patients go from physician to physician without relief, only to be cured in the end by some one giving them 10 to 20 drops of the aromatic spirit of ammonia for each attack.

In other cases the cure of this condition rests upon the removal of the state of atony or dilatation of the gastric walls. (See Gastric Dilatation.)

Intestinal indigestion depends upon almost the same causes as does gastric dyspepsia, and is to be treated in much the same manner, chiefly by a careful study and regulation of the patient's diet, and by the use of a number of remedies calculated to supplant to some extent the normal juices by artificial ferments, given with the meals, or the food prepared in a predigested form before it is taken.

Pancreatin should be given in good dose (5 to 10 grains), with bicarbonate of sodium, and alkaline mineral waters used. (See Biliousness.)

Sometimes where intestinal indigestion is present great flatulence often comes on and is an annoying symptom. Very commonly in these cases it will be found that the patients think they have heart disease, because of the pain they suffer under the præcordium. This pain is due to the accumulation of flatus in the small intestine, or more commonly to its pressing upward at the angle where the transverse colon turns to go down to the descending colon and sigmoid flexure. Under these circumstances the following prescription will be found of service.

℞.—Acid. nitric. dil.	fʒj.
Tinct. cardamom. comp.	f℥vj.

M.—Dessertspoonful in water four times a day.

In old persons flatulence is frequently found in the large bowel, and is often associated with atony of the muscular coats of the gut.

Under these circumstances the following prescriptions will be found of service:

℞.—Asafœtidæ . . . . gr. xl.
Ext. nuc. vom. . . . . gr. iv.
Ext. physostig. . . . . gr. iii.
Oleoresin. capsici . . . . ♏x.
M.—Ft. in pil. No. xx. S. One pill t. d., two hours after meals.

Or,

℞.—Tinc. belladonnæ . . . . fʒij.
Tinc. physostig. . . . . fʒj.
Spt. camphor. . . . . q. s. f℥iij.
M.—S. Teaspoonful two hours after meals, or whenever needed.

Where intestinal indigestion results in lientery the treatment becomes entirely changed, except in regard to the use of a predigested milk diet, and efforts must be made to increase the secretion of the glands of the intestinal wall. Often minute doses of mercury or podophyllin may do this, as $\frac{1}{40}$ to $\frac{1}{60}$ grain of the first or second, respectively. More commonly, however, the mixture of nitric acid, given above, will be in order, or, perhaps, the following, if the liver be found to be torpid:

℞.—Acid. nitro-hydrochlor. (not dil.) . . . . fʒj.
Infus. gent. comp. . . . . . . q. s. f℥vj.
M.—S. Dessertspoonful every four hours or after meals in water.

INSOMNIA.

Insomnia is a condition characteristic of almost every disease in some of its stages, and arises from such a host of causes that the physician may not be able to discover any one of them for days after the patient is first seen. As a general rule, the patient consulting a physician with this symptom expects a prescription to be given at once and the cause found out afterward, or, in other instances, wilfully defeats all the efforts of the practitioner for one reason or another, but desires relief although he may not choose to aid in its attainment. Under these circumstances the physician may safely employ certain drugs according to the information concerning the patient's state that he may have.

One of the most common remedies is chloral given in the following manner:

℞.—Chloral . . . . ʒiv.
Syr. simplic. . . . . fʒiv.
Aq. cinnamomi . . . . q. s. f℥iij.
M.—S. Dessertspoonful at night,

Or,

℞.—Butyl chloral-hydrat. . . . . ʒj.
M.—Ft. in pil. No. xii. S. One, two, or three pills at night as needed.

Where, for any reason, as the presence of a weak heart, chloral is contra-indicated, resort may be had to the bromides, and if so, and the patient is a female, the drug should always be accompanied by a small dose of arsenic, generally in the form of Fowler's solution, 1 to 3 drops three times a day. The following prescription is useful:

℞.—Potas. bromid.		ʒij.
Liq. potas. arsenit.		fʒss.
Aq. cinnamomi	q. s.	f℥vj.

M.—S. One to two dessertpoonsfuls at night.

In many cases larger amounts of the bromide will be needed.

Where the sleeplessness is due to pain, chloral is of little value and bromides are worth but little more. Under these circumstances, by using what is known as the "crossed action of drugs" we can often obtain a very good effect. Thus morphine and chloral both act on the brain to produce sleep or, in other words, their action is here crossed, but one relieves pain and the other does not, one kills by failure of the heart in overdose, the other by respiratory failure. As a consequence large doses of neither one can be given alone. The following is therefore a useful combinatlon either where one drug fails, or dangerously large doses of either one have to be used to obtain the desired result:

℞.—Morphinæ sulph.		gr. iv.
Chloral		ʒij.
Aq.	q. s.	f℥iv.

M.—S. Dessertspoonful at night.

In cases where insomnia is due to mania, hyoscine is very useful, given in the dose of $\frac{1}{100}$ to $\frac{1}{90}$ grain by the mouth or, $\frac{1}{100}$ to $\frac{1}{110}$ by the hypodermic needle. Owing to its tastlessness the powder may be put on the tongue, but it is best to order a little sugar of milk or white sugar (1 grain) to every small dose of hyoscine, in order to give it bulk.

Where insomnia follows mental effort, avoidance of all cerebral activity should be insisted upon during the evening, and if the feet are cold sleep should be induced by the use of a hot-water bag at the feet and cold to the head.

During the last few years a very large number of remedies have been introduced as hypnotics, such as somnal, paraldehyde, chloralamide, sulphonal, amylene hydrate, and others. None of them compare in therapeutic activity with the older remedies although sulphonal and chloralamide seem to be the best of the lot. The dose of the sulphonal is 10 to 20 grains in powder, but as it is large in bulk and hard to swallow it should be used in a prescription made up as follows:

℞.—Sulphonal		gr. xxx.
Syrup.		f℥ij.
Mucilag acaciæ		fʒij.
Aq. destillat.	q. s.	f℥j.

M.—S. Half to all of this at one dose, as may be needed.

Chloralamide is given in the dose of 15 to 60 grains dissolved in wine or given in capsule. Paraldehyde is given in the dose of 20 to 60 minims. As it is disagreeable in odor and taste, it must be given in capsule, and is very apt to disorder the stomach.

The dose of amylene hydrate is the same as that of paraldehyde. It is a liquid and has no effect in insomnia from pain.

Somnal is used in the dose of 10 to 40 minims with licorice and water, and possesses considerable power.

In the treatment of insomnia it should be remembered that drugs should be used which if possible, will quiet the part of the brain which is most active. Thus if the patient tosses much, we use bromides and chloral as motor depressants. If sensation is active bromides and the hot-pack as sensory quietants.

INTERMITTENT FEVER.

In all forms of intermittent fever, whether the attacks are diurnal, quotidian, tertian, or quartan, the best remedy for their prevention is quinine, which should, under these circumstances, be given about two or three hours before the attack is expected, so as to be absorbed and physiologically active when the paroxysm is due. This is often overlooked, and the dose ordered at the time of the expected attack, with a failure as a result. Not only should this be done, so that sufficient time may elapse for absorption, but the fact should be remembered that the chill often begins an hour earlier each day, and will be in full sway before the quinine can stop it, if the drug be not administered at the proper time. Experience has proved that quinine never acts as favorably if constipation is present as when the bowels are lax, and hepatic activity seems particularly necessary for its full effect. To obtain the full influence of the drug it should be preceded, by some four or five hours, by $\frac{1}{6}$ to $\frac{1}{4}$ grain of calomel every fifteen minutes until a grain is taken, or by a dose of podophyllin amounting to $\frac{1}{10}$ to $\frac{1}{8}$ grain. If podophyllin is used, a longer time should be allowed, because of its slow action.

The dose of quinine varies with the exigencies of the case, which in turn generally depend upon the region in which the patient lives or has lived. Ten to fifteen grains in one dose are generally sufficient in the eastern and northern States, but as much as twenty to forty-five or even sixty grains may be required in the southern parts of the United States and elsewhere. When these very large doses are employed, the drug should be given partly hypodermically and partly by the rectum in suppository, or solution, as well as by the stomach. (For the best salts for hypodermic use, see article on Cinchona, page 128.) If the stomach is irritable, these means of entrance into the body are absolutely necessary.

In cases where the attacks are several days apart, small doses of 3 to 6 grains are to be taken daily between the paroxysms, or, what is better, arsenic may be given in moderate sized dose for its antiperiodic influence during the intermission. In this manner the quinine acts with full force when most needed.

Having considered the prophylaxis of a chill let us turn to the treatment of the attack itself. It must be remembered that the chief harm of the malarial poison is exerted at this time by the dangers of internal congestions and engorgement of the abdominal and thoracic organs. The physician should, therefore, try to prevent, as far as possible, too great a rigor and, if stasis results from the chill, overcome it, not by depletants, unless the case is very sthenic, but by stimulants, such as digitalis, which will drive out the blood from the congested area.

If a full meal has just been eaten the stomach should be emptied by an emetic dose of ipecac, 2 drachms of the powdered drug to an adult, or by 20 grains of sulphate of zinc. There is no use of giving quinine at this time, as absorption from the stomach and subcutaneous tissues is almost stopped.

Alcoholic stimulants are not to be employed. If the chill is severe enough to endanger the patient's life measures must be used to control it. Chloroform may be inhaled and immediately preceded by laudanum by the bowel or mouth. If given by the mouth a little ether or chloroform may be added to the dose. The opium may be used hypodermically in the form of morphine, in the dose of $\frac{1}{6}$ of a grain combined with $\frac{1}{60}$ of a grain of atropine.

In the fevered stage little can be done, except to add to the patient's comfort by cool drinks and cool sponging, or if the fever becomes excessive by the use of antipyrine or the ice-pack. The latter has seldom to be used, as the fever is generally too fugitive to need such measures.

The sweating stage needs no measures for itself, unless exhaustion is caused by it, when stimulants may be cautiously used as needed, and large draughts of water at ordinary temperatures be swallowed.

Many measures have been resorted to to put off a malarial attack, the chief of which is the use of ether or chloroform anæsthetization at the time of the expected paroxysm, or of the nitrite of potassium or sodium in 10 grain dose for the same purpose. Where the "chill habit" exists and depends largely upon nervousness it has been broken by misplacing the hands of the clock, and so getting the patient past the time for his attacks without his knowledge.

IRITIS.

Iritis, or inflamation of the iris, as usually encountered is caused either by syphilis, rheumatism, or gout. It may also be traumatic;

less frequent causes are gonorrhœa, diabetes, malaria, and tuberculosis. Metastatic iritis occurs in pyæmia, relapsing fever, etc. The most marked symptoms are severe brow pain; fine ciliary injection; discoloration of the iris and immobility of the pupil, due to the formation of adhesions between the iris and the capsule of the lens. The most important local remedy is atropine, to be used every two hours according to circumstances. If for any reason this is not tolerated, duboisine, or daturine may be substituted. Cocaine increases the mydriatic power of atropine.

Pain may be relieved by leeches to the temple and the use of dry heat externally (cotton batting heated over a register will suffice) or hot fomentations—water, chamomile infusion, or laurel-water (1 to 15).

In traumatic iritis iced compresses are suitable in the early stages, but not in the later periods, and not in any other form of iritis. Great care must be taken not to mistake iritis for conjunctivitis on the one hand and glaucoma on the other; delayed use of atropine and the employment of astringents on account of the former error, or the instillation of atropine because of the latter, would constitute serious therapeutical blunders. In serous iritis, or that variety in which there is a hypersecretion of the aqueous humor, which becomes turbid, and a precipitate of dark spots occurs upon the membrane of Descemet, atropine must be cautiously instilled, owing to the tendency to increased tension. If this occurs, paracentesis of the cornea may be needed, and pilocarpine should be given internally, if the vitreous becomes opaque.

In true syphilitic iritis, mercury must be pushed to the point ot tolerance, but it is not necessary to salivate the patient. Any form of mercury usually employed in secondary syphilis may be used—calomel, blue mass, or protiodide of mercury—but the most efficacious method is by inunction; this is preferable even to hypodermic medication in the opinion of many authors. After the mercurial impression has been made, and the pupil is well dilated, potassium iodide, either alone or in combination with bichloride of mercury, is indicated.

In plastic iritis, appearing six to eight months after the disappearance of the secondary symptoms, this latter treatment, without the previous use of mercury, has been recommended. Carmichael's plan, consisting in the administration of drachm doses of turpentine, in addition to which potassium iodide may be given, receives the endorsement of some surgeons.

Rheumatic iritis calls for salicylic acid, oil of gaultheria, and, later, potassium iodide; in the chronic types of the affection Zollicoffer's mixture is an excellent remedy. Potassium iodide should be administered in gonorrhœal iritis and relief occasionally follows a pilocarpine sweat. In other forms of iritis the treatment of the constitutional disorder which has occasioned the local inflammation is necessary, and if the iritis become purulent, surgical interference is usually required. In any variery of iritis the intense pain should be alleviated with morphine, or other anodyne sufficiently active to secure sleep. During the course of the disease saline laxatives may be administered, and after the subsidence and cessation of the specific treatment, a course of iron tonics is an excellent routine practice.

KERATITIS.

Keratitis is the name applied to the various types of inflammation of the cornea. If this inflammation is associated with a breach in the continuity of the corneal surface it is termed corneal ulcer, and four characteristic symptoms supply the indications for local treatment: 1, photophobia or dread of light; 2, blepharospasm or spasmodic contraction of the orbicularis muscle; 3, congestion of the bloodvessels; 4, pain; while any existing dyscrasia or constitutional condition upon which the local disease may depend, requires general medication.

Interstitial Keratitis.

Interstitial keratitis is that form of chronic diffuse inflammation of the cornea characterized by ciliary congestion, and a ground-glass appearance of this membrane, most common between the ages of five and fifteen, and in the vast majority of cases the result of inherited syphilis. No local measure is sufficient, anti-syphilitic treatment being of paramount importance. During the height of the ciliary congestion warm antiseptic lotions and atropine are indicated, the latter especially to prevent the tendency to iritis. Severe pain may be alleviated by the use of a leech to the temple, if the subject be of sufficient age to justify the employment of local bleeding.

Various other types of keratitis are described as the result of constitutional disturbances, such as gout (Hutchinson), malaria (Kipp, Van Milligen), or any condition of the system associated with great exhaustion, such as irregularities in the menstrual functions, certain forms of pulmonary disorders (true herpes of the cornea, Horner). The local management of these cases does not differ from that which has been described. The co-existing constitutional disturbances must be combated with suitable remedies.

Phlyctenular Keratitis.

Phlyctenular keratitis appears in the form of small blister-like bodies, sometimes single, sometimes multiple, frequently situated directly at the corneo-scleral margin, which become yellow, break down, and leave an open ulcer (phlyctenular ulcer), to which runs a leash of injected bloodvessels. The disease is common in children; often follows in the wake of the exanthemata, and is so frequently associated with a strumous diathesis that it was formerly called strumous ophthalmia. Congestion may be relieved by frequent irrigation with a warm boracic acid solution. Pain and irritation call for the use of atropine drops (grains 4 to the ounce), which should be continued until the ulcer is covered with regenerated epithelium, when the process of cicatrization may be hastened by the insertion daily into the conjunctival sac of a small quantity of yellow oxide of mercury salve, or dusting it with finely powdered calomel, provided the patient is not taking, at the same time, any form of iodide. During the whole treatment the eyes should be protected by dark glasses, and the subject permitted to go out into the open air. All local treatment will prove unsatisfactory unless associated with strict hygiene, carefully regulated diet, and constitutional measures—tonics and alteratives.

If the photophobia becomes distressing in spite of the other treatment, it has been suggested that this may be relieved by the use of cocaine, a practice that by no means commends itself in corneal ulceration in spite of the temporary relief from the local anæsthesia. Relief of this symptom in many instances follows the use of a douche of cold water on the closed eyelids.

Suppurating Keratitis.

Suppurating keratitis, or that form of inflammation characterized by the formation of pus in the cornea, may be either diffuse, as, for example, a complication of purulent ophthalmia, or circumscribed, forming an *abscess of the cornea.* If the pus gathers in the bottom of the anterior chamber the condition is called hypopyon, and the disease hypopyon keratitis. These conditions require prompt treatment, namely, frequent application of hot compresses, which may be advantageously composed of slightly carbolized water, atropine drops, or, in the opinion of many, eserine ($\frac{1}{2}$ to 2 grains to the ounce). If the abscess forms, the pus should be evacuated by a formal operation, either by dividing the anterior surface or by performing the operation after the manner of Saemisch.

In addition to the types of disease which have been described we have the examples of *sloughing* or *infective ulcers,* which are seen under a variety of conditions, and often are directly traceable to an injury, being more common in elderly people. The tendency of all of these ulcers is to spread, from whence one important variety has received the name *serpiginous.* The mild measures are antiseptic lotions, either boric acid or bichloride of mercury, iodoform, hot compresses, and instillations of either atropine or eserine. Formerly atropine was almost exclusively used; in recent years eserine has been much employed. It certainly has the power of limiting a sloughing process in the cornea. Threatened perforation may be averted by a pressure bandage. This is made by placing upon the eye a wad of antiseptic cotton, over which, in figure-of-eight turns, a flannel roller is applied. If, in spite of this, the process continues, the following measures have met with the greatest success: Touching the margin of the ulcer with a strong solution of nitrate of silver, 10 to 20 grains to the ounce, care being taken that the ulcer alone receives the application; scraping the floor of the ulcer with a small curette or spud; and, finally, and this is the best method, the use of the actual cautery. In every case of sloughing ulcer the lachrymal passages must be explored for obstruction.

Sequelæ of Corneal Ulceration.

After healing of a corneal ulcer the cicatrix consists of a more or less dense white spot in the cornea (macula). If these scars are thick and white they are irremediable by local medication, and require surgical interference for optical purposes. If, however, they are diffuse, much good will follow systematic massage of the cornea, aided by the introduction of a small particle of yellow oxide of mercury salve. The massage is performed as follows: A piece of the salve, the size of a split pea, is introduced beneath the upper lid; upon the closed lid a finger is placed, and regular motions made through it over the surface of the cornea, namely, vertical, lateral, and radial motions, the *seance* being completed by circular movements. The whole should last from one to three minutes.

LACHRYMAL ABSCESS.

Lachrymal abscess results from suppuration in a chronically distended lachrymal sac, owing to the presence of obstruction in the nasal duct, and exists as a swelling under the skin at the inner canthus, pressure upon the surface causing an escape of pus through the canaliculi. The treatment is practically confined to surgical interference—that is, division of the canaliculi and washing out the distended sac with antiseptic fluids, and restoring the patulency of the nasal duct by the use of probes as soon as the inflammatory symptoms have subsided, or if the skin over the seat of the abscess is thinned and rupture is threatened, by free puncture downward and outward. Much comfort will ensue from the use of hot compresses over the inflamed area. These may be made in the ordinary way, or are still more efficacious if composed of a lead lotion, the ordinary lead-water and laudanum answering the purpose very well.

LID ABSCESSES.

Lid abscesses are seen more frequently in children than adults, as the result of injury, the sequel of acute illness (epidemic influenza, pulmonary catarrhs, fever, etc.), or from local infection; under the latter circumstance they may assume a gangrenous type. The treatment is, that for any form of abscess—poultices, preferably in the form of hot compresses, early incisions, antiseptic solutions, and tonics.

LARYNGITIS, ACUTE.

Acute laryngitis is an inflammation involving the mucous membrane of the larynx, to which it is usually confined, although it sometimes assumes a phlegmonous form, in which the deeper structures of the larynx are involved. It may in form be idiopathic or traumatic.

The *idiopathic* form results from exposure to cold, extension of inflammation from above or below, or a local expression of a constitutional disease, as in scarlet fever, diphtheria, or syphilis, or as an acute exacerbation in chronic laryngitis.

If *traumatic*, it may be the result of the inhalation of foreign bodies, as fish-bones, pins, or from operations upon the larynx.

The *symptoms* of acute laryngitis are hoarseness of voice, pain in the throat, tickling cough, and difficult or painful deglutition. The cough is often annoying and out of proportion to the amount of expectoration. It may be of brazen or barking in character, but should there be much swelling is more likely to be smothered. These symptoms may be aggravated by dyspnœa.

The attack may be ushered in by a chill, followed by fever, headache, pain in the back and limbs.

Acute laryngitis may be strictly local, but, as a rule, the inflammation does not limit itself to the larynx, but extends into the pharynx, even reaching the tonsils.

When the epiglottis becomes inflamed the pain is exquisite and is felt both in swallowing and in using the voice. Extension to the trachea gives sub-sternal pain, while pressure on the breast-bone excites coughing.

Unless aborted, an attack lasts about a week or ten days, and may continue three weeks or more.

A laryngoscopic examination gives us the only means of making a perfectly accurate diagnosis. The mucous membrane varies from bright red to purple, the shade depending on the severity of the inflammation present.

If the inflammation be diffused, all the parts are of the same color, the ventricular bands and arytenoids usually being first to swell. (The ventricular bands may overlap the cords.)

The inflammation may be circumscribed. The writer has seen instances in which the vocal cords alone escaped and remained perfectly white. Sometimes only one side is affected, one cord alone being involved. Pyriform swelling of the same arytenoid generally occurs and strongly suggests incipient phthisis. The *trachea* when inflamed may be seen below the glottis, appearing of a diffused red color, the rings being hidden by the swelling.

With some, every attack of coryza ends in laryngitis; or, as popularly expressed, the cold "goes down."

Treatment.—Prompt measures will often abort an attack.

During an acute attack, the patient must be kept quiet, talking as little as possible, remembering that whispering is more injurious than vocalization. The diet should be bland and unirritating, but nutritious.

At the outset, a hot mustard foot-bath and demulcent drinks should be administered, and small, repeated doses of calomel given and followed by a saline purge. Fever is to be combated by aconite combined with a diaphoretic. An opiate— as a Dover's powder— may be required to relieve pain and give rest. Inhalations of steam charged with benzoin, camphor, or cubebs, may be used.

Locally, the best results follow the employment of alkaline or astringent sprays, followed by the insufflation of anodyne and astringent powders into the larynx.

Gargles are of very little use in laryngitis, better results being obtained from the use of lozenges dissolved slowly in the mouth. Excessive cough may be relieved by nervous sedatives, bromide of sodium or potassium combined with small doses of potassium cyanide. Opiates disorder the digestion, and should only be used when specially indicated.

During convalescence tonics, fresh air, and change of climate are indicated. Attention to the state of the skin and the use of woollen underwear are advisable.

Subacute Laryngitis.

This form of laryngitis often occurs in debilitated subjects who are not vigorous enough to carry out an acute inflammation, nor have recuperative power to throw off an attack rapidly. It may also follow an acute attack when, from any cause, convalescence is retarded.

It presents very little constitutional disturbance, and its symptoms are, for the most part, the symptoms of acute laryngitis, excepting that they are all of a milder type. Pain, soreness, and a burning sensation are referred to the region of the larynx. The voice is husky, and efforts at conversation excite paroxysms of coughing. The expectoration, at first only glairy mucus, becomes yellow and more abundant as the disease progresses. Laryngoscopic examination shows that the mucous membranes are redder than normal, but not the livid shade seen in the acute form. Mouth-breathing, due to occlusion of one or both nostrils, should be looked upon, when present, as a predisposing cause.

The treatment adopted in the acute form is usually sufficient to produce a cure. The inhalation of steam charged with an ethereal oil or gum resin relieves the engorged vessels and stimulates the mucous membrane to healthier action.

Compound tincture of benzoin, 30 or 40 drops in a cupful of hot water, has done the writer good service. An extemporaneous inhaler is made by covering the cup with an inverted funnel. The benzoin will be volatilized by the heat, and the medicated steam is readily inhaled from the small end of the funnel. The vapor should be drawn in through the mouth gently and firmly, the breath being held a second and then exhaled through the nose, and the inhalation continued until the water cools, this process being repeated at intervals during the day.

As this hot inhalation often induces perspiration, it may be well to caution the patient against exposure in the open air immediately after using it. This form of inhaler has the advantage of being simple and cheap, as well as effective, and may be constructed at a moment's notice in any kitchen. It is popular among the patients at the University Throat Dispensary.

An inhaler devised by Dr. Carl Seiler[1] meets the requirements, and, being made of tin, is not injured by hot water. It consists of a tin cup having a lid shaped like an inverted funnel, the end of the funnel terminating in a rubber mouth-piece. A tin tube runs through the lid and reaches below the liquid in the cup. Suction upon the mouth-piece causes the air to be drawn down through the tube and bubble up through the liquid. By this means the vapor is more strongly charged with the preparation used.

In addition to benzoin, we may use camphor, fluid extract of cubebs, or tar as inhalations which are stimulating or sedative to the mucous membranes in different degrees. Astringent sprays of sulphate of zinc, ferric alum, tannic acid, or a weak solution of bichloride of mercury in the hands of a physician are useful.

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[1] Diseases of the Throat, C. Seiler, p. 150.

Even better results are obtained by the *insufflation* of astringent powders into the larynx, having first removed all adherent secretions by an alkaline or antiseptic spray.

This method is more accurate than that of astringent sprays, but the insufflation of powders into the larynx with any degree of confidence presupposes considerable proficiency in the use of the laryngoscope, a description of the methods of which would carry us beyond the limits of a work of this nature.

Among remedies suitable for insufflation are: Sulphate of zinc, reduced with an equal part of sugar of milk or other inert substance. (The powder must be so fine that no grit is felt when rubbed between the fingers.) Tannic acid reduced to one-fourth or one-fifth, combined with iodoform, is useful on abraded or ulcerated surfaces. To this mixture, subnitrate or subcarbonate of bismuth may be added when indicated, and morphine also, for the relief of pain. Acetate. of lead in proportion of 10 to 20 grains to ½ ounce, combined with a little acetate of morphine, gives us what may be called a *solid* lead-water and laudanum.

Nasal catarrh, if present, must be treated, otherwise the cure of the laryngitis will probably not be permanent.

To prevent a return or the development of chronic laryngitis, the treatment should be followed up by tonics, as iron, quinine, strychnine, cod-liver oil, together with a generous diet and exercise in the fresh air. Owing to the intimate relationship between the skin and mucous membranes of the nose and throat, the use of woollen underwear is important. Friction to the skin and Turkish baths, especially when a gouty or rheumatic ailment exists, may give good results.

Should any permanent laryngeal thickening remain, potassium iodide, with or without arsenic, continued for a long time in very small doses, or one of the lithia waters, may be of service.

Chronic Laryngitis.

This form of laryngitis, like the subacute, is divided into the simple catarrhal or *idiopathic*, and the *traumatic*. The catarrhal form also includes those varieties in which a constitutional vice occurs, as phthisical, gouty, or syphilitic laryngitis.

Chronic laryngitis may develop insidiously, or it may be the direct result of an acute or subacute attack.

In a state of ordinary health, an attack of acute laryngitis runs a course of from one to two weeks, terminating in recovery.

When from any cause the vitality is reduced, convalescence may be retarded, and we have what is known as subacute laryngitis, a lower grade of inflammation than the acute form, but still tending to recover under favorable conditions. A renewal of the attack at this stage may carry the patient beyond the line where nature unaided is able to right herself and chronic laryngitis results.

A lowered state of health is a predisposing cause, particularly when there is a lowered nervous tone.

Overwork, business reverses, or severe mental strain ; a sedentary life, continued exposure to impure air, sewer gas, fumes from chemicals, or the dust and fibres of cotton and woollen mills—all act as predisposing or exciting causes of chronic laryngitis. Loss of sleep, over-indulgence and excesses tend to produce the same result. In regard to the use of tobacco, cigarette smoking is more injurious than either the pipe or cigar, for the reason that the cigarette smoke is inhaled, and the irritating products resulting from the destructive distillation of the woody fibre are drawn directly into the larynx.

Chronic laryngitis is essentially a disease of civilized life. One of its most common sources is found in mouth-breathing and its consequences.

The nose is so constructed that a large surface of mucous membrane, warm and moist, comes into contact with the inspired air, imparting to it its warmth and moisture, while particles floating in the air adhere to the moist surface and are discharged with the flow of mucus which they excite.

In mouth-breathing no such preparation of the air occurs, and the delicate mucous membrane of the larynx, subjected to this constant source of irritation, is kept in a congested condition.

The symptoms of ordinary chronic laryngitis are hoarseness, dryness of the throat, tickling sensations, vague feelings of discomfort, a sense of constriction about the throat, and a dry, hacking cough. The expectoration is usually scanty and raised with difficulty. A profuse discharge from the vault of the pharynx, removed by hawking, indicates more or less naso-pharyngeal catarrh.

The mucous membrane in simple cases, as seen by the laryngoscope, is redder than normal. The ventricular bands may be thickened until they nearly overlap the cords. The vocal cords vary in color from a muddy tinge to a deep livid red. The inflammation sometimes occurs in livid spots.

Injection of the vocal cords may be marked, showing twigs of dilated bloodvessels running longitudinally.

As the result of irritation occasionally a minute white fibrous swelling develops on the free edge of a vocal cord, or two may form directly opposite each other, interfering with the proper approximation of the cords. They are usually mere points and the writer has only seen them occur in the throats of singers. They gradually become smaller under astringent applications and attention to hygiene.

Finally, *fissures* or abrasions may occur in the larynx in chronic laryngitis, the common location being the inter-arytenoid space. A small laryngeal fissure is not always easily recognized.

The mucous membrane at that point is usually darker than the surrounding tissue, and may be bathed in a muco-purulent secretion. In the morning, after considerable coughing, a small pellet, resembling boiled sago, which has formed during the night, may be coughed from this spot.

When a fissure of this nature granulates it may give rise to many of the symptoms of laryngeal phthisis, diagnosis from which the laryngoscope alone clears up.

The physician must strike at the root of the trouble by finding the cause and removing it. If due to faulty use of the voice, either in speaking or singing, proper training in its management and care will be productive of decided benefit.

As far as possible, all sources of irritation should be removed. Relieve nasal obstruction, enlarged tonsils, or anything that prevents the free circulation of air through the nose, for we cannot look for a cure while mouth-breathing continues.

Complete rest of the voice, with attention to the general health, will greatly relieve the throat in most instances; but, unfortunately, the trouble usually returns on resuming the use of the voice. In fact, it is not always advisable for one who must use his voice again to prolong the rest indefinitely, for a throat accustomed to heavy demands is liable to stiffen under prolonged disuse, the voice never quite regaining its old power and flexibility.

After the laryngitis has made decided improvement, the *judicious* use of the voice has seemed to the writer, in some instances, to have favored resolution, and to have kept the muscles from degenerating.

Very much depends on local treatment in the cure of chronic laryngitis, and some of the directions given for treating sub-acute laryngitis apply here equally well.

After cleansing the mucous membrane of the larynx from secretions, the use of astringent sprays gives excellent results.

The insufflation into the larynx of astringent powders, as sulphate of zinc reduced one-half; or tannic acid one-fourth or one-sixth, combined with boracic acid, subnitrate of bismuth and sulphate of morphine, is useful in painful conditions.

An excellent powder for protecting and covering raw or ulcerated surfaces is a modification of the formula known as "Ferrier's snuff:"

R.—Morph. sulph.	gr. v.
Bismuth. subnit.	ʒ ijss.
Pulv. acaciæ	gr. xxv.

To this may be added iodoform, when indicated for ulcerations or abrasions. Indolent or granulating inter-arytenoid fissures should be touched with a strong solution of nitrate of silver applied by a brush attached to a bent probe, or a little of the pure salt or the "mitigated" stick fused on the end of a silver applicator.

This is by no means an easy operation to perform, as it is important to avoid touching any other part of the larynx, as this would increase the spasm which is liable to occur.

Stimulating vapor inhalations, such as compound tincture of benzoin, tar, or cubebs, used as described for subacute laryngitis, give decided relief.

Combine pleasant occupation in the open air or travel in a dry, bracing climate. As a rule, the air at the seashore is too moist for chronic laryngeal troubles.

Sufferers from chronic laryngitis should always wear woollen underwear, and keep the skin and the secretions generally in a healthy condition.

LEUCORRHŒA.

This is a condition, vulgarly known as the "whites," consisting in a hypersecretion from the glands, which pour out their contents into the vagina or the cervical canal of the uterus, or even into the cavity of this organ.

It is a state dependent upon many causes for its existence, the chief of which are a condition of the system when it is "run down" from any cause, and prevented function of the glands or their surroundings. In some persons who seem perfectly strong and well it would appear to be due to an effort of the system to overcome plethora. The character of the discharge varies with almost every case. In some instances it is thick and tenacious, in others so liquid as to trickle down the limbs in a stream and greatly soil the clothing. In most of the latter cases catarrh of the Fallopian tubes or ovarian irritation and tenderness will be present. Where the secretion is very thick and tenacious it generally arises from the cervical canal, while that from disorder of the vaginal wall alone, independent of other morbid conditions, may be one or the other.

The treatment of these forms of leucorrhœa may be divided into two parts; one, that directed to the remedying of the morbid process through the use of drugs by the mouth, the other by their employment locally.

It is needless to state that in that form dependent upon excessive lactation or other exhausting manner of life, tonics of an active character are needed. As a general rule anæmia will be present, and the following pill will be found of service:

℞.—Acid. arseniosi . . . . gr. ¼
Ferri redactum . . . . gr. ij.
Quin. sulph. . . . . gr. xx.
M. Ft. in pil. No. xx.—S. One pill t. d. for an adult, after meals.

Or,

℞.—Tr. ferri chlorid.		f ʒ j.
Tr. cinchonæ comp.		f ℥ ij.
Tr. gentian. comp.	q. s.	f ℥ iv.

M.—S. Dessertspoonful t. d. after meals.[1]

Sometimes equally small doses of the sulphate of iron are better for these purposes owing to its astringent properties, but when these preparations of iron are used, care must be taken that the bowels are kept active and that the stomach is not disordered. Associated with the use of these internal remedies should be a moderate amount of exercise and the avoidance of late hours and rich foods.

The local applications which are of value in these states consist in counter-irritation and injections or painting with proper fluids. In the leucorrhœa dependent upon irritation of the ovaries with catarrh of the Fallopian tubes, the use of small blisters made by the employment of cantharidal collodion over the groin on either side is often accompanied by good results. At the same time the vaginal surfaces surrounding the cervix uteri may be painted with a mixture of iodine, carbolic acid, and chloral, such as is used by Dr. Goodell, as follows:

℞.—Iodi resublimat.		ʒiv.
Acid. carbol. crystal. Chlorali	āā	℥j.

Rub the iodine and chloral in a glass mortar into a powder and add the carbolic acid. S. Formula. To be used by the physician only.

The following pill may also be employed:

℞.—Hydrarg. chlor. corros.	gr. ½.

M. Ft. in pil. No. xx.—S. One t. d. after meals.

The remaining treatment of leucorrhœa consists in the use of astringent injections. A very cheap astringent injection is made by adding 1 ounce of powdered white oak bark to each pint of water, or tannic acid and glycerin in the proportion of 1 ounce to 2 quarts of warm water. Ringer recommends the following:

℞.—Sodii bicarbonat.	ʒj.
Tinc. belladonnæ	fʒij.
Aquæ.	Oj.

M.—S. Use as a vaginal wash.

Where the discharge is fœtid a solution of permanganate of potassium should be used as an injection in the strength of ½ drachm to 1 pint of water. Sometimes a tampon thoroughly saturated with a powder of iodoform and tannic acid, equal parts, and packed around a discharging uterine cervix, is of service.

In the use of vaginal injections in females it is important to remember that they should be in large quantities. Nothing is more antagonistic to true asepsis than the usual manner in which these applications are made. Generally a pint of the solution is placed in a basin over which the woman squats and by means of a syringe forces the liquid into the vagina as fast as it runs out, thereby filling the syringe joints with the dissolved secretions and returning to the vagina as fast as they flow away the impurities which have left it. The only proper way to do is to have the solution in one basin to the extent of 1 gallon and for the patient to squat over a second basin into which the impure liquid may run.

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[1] In both these prescriptions the small amount of iron and arsenic will probably be noted, but this is done advisedly, as iron and arsenic do as much good to the blood in small as in large amounts. (See Iron.)

A very useful astringent injection may be made by ordering:

℞.—Zinc. sulphat.	fʒj.
Alumin. sulph.	fʒj.
Glycerinæ	f℥vj.

M.—S. A tablespoonful to each quart of water.

LUMBAGO.

This is a form of myalgia or muscular rheumatism of the muscles of the loins and small of the back, and is frequently the result of lifting heavy weights or results from other strains. In many cases acupuncture is very useful, particularly if the trouble is bilateral. Sometimes after its use the patient can straighten up at once and retain that position. In other instances antipyrine or antifebrine in 10 to 20 grain doses of the former and 4 to 8 grain doses of the latter are of service, and iodide of potassium and salicylic acid are not to be forgotten if the condition of the patient does not rapidly improve. Sometimes a hot foot-bath and a Dover's powder on going to bed will produce a cure, and ironing the back with an ordinary hot laundry iron at a proper heat, a piece of newspaper or cloth being placed over the skin under the iron, is very efficient. Sometimes counter-irritation in the shape of a blister or a mustard plaster or capsicum draft will give relief.

Where these measures fail the reverse treatment may be tried, such as an ice-bag, placed over the loins, or an ether spray turned on the part till the skin is greatly blanched.

MALARIAL FEVER.

(See Intermittent and Remittent Fevers.)

MANIA, ACUTE.

Space is wanting to consider the thorough and complete treatment of mania as it comes to the neurologist. All that can be done here is to denote temporary measures suitable for cases which are brief in their course.

In those cases which occur after confinement and are not supposed to be based upon permanent trouble, cimicifuga racemosa is said to be very useful in the dose of 20 to 30 drops of the fluid extract of cimicifuga three times a day, while for the rapid quieting of the patient we may use hyoscine hydrobromate in the dose of $\frac{1}{100}$ grain. In other instances, if the kidneys are healthy, full doses of chloral may be used, and if an active preparation of cannabis indica can be had at least 1 grain of the solid extract, or 1 drachm of the tincture should be employed, and it will be found particularly serviceable if 60 grains of one of the bromides can be combined with it.

Where a patient suffering from mania is so violent that nothing can be done with him, he should be held and an emetic dose of $\frac{1}{12}$ grain of apomorphine be given hypodermically, to vomit and relax the muscular system, or he may be tied or anæsthetized sufficiently to enable the physician to administer proper remedies. Sometimes full doses of morphine are needful, and in others a cold douche to the head, the body being in hot water, is of service.

MELANCHOLIA.

This is not the place for a discussion of melancholia of so severe a form as to amount to insanity, since the treatment of this latter state is very various and largely dependent upon the skill of trained physicians who are alienists.

There is one form of melancholia, however, which may often be rapidly relieved by a simple measure. It is that dependent upon the condition of the system in which oxaluria is present. Whenever an individual complains of melancholia the urine should be examined, and if any oxalate crystals are found, dark-red, fresh nitromuriatic acid should be given in the dose of 5 drops after each meal in a half tumblerful or more of water. In order to guard against error it is well to remember that pears, tomatoes, and cabbage, when taken as food, all cause the presence of oxalates in the urine for a short period.

MENINGITIS, ACUTE.

Meningitis is to be treated as in any other form of acute inflammation occurring in a sthenic or dynamic individual, and particularly does its treatment correspond to that of the other inflammations of large serous membranes, such as peritonitis or pleurisy.

In the early stages the patient should receive sufficiently large doses of aconite or veratrum viride to impress strongly the circulatory system. These drugs have the power of producing such dilatation of the blood-paths throughout the body that the congested or inflamed area is relieved of its excess of blood, because the pressure being less elsewhere it obeys the law that liquids always try to escape from pressure, and so leaves the meninges of the brain for the vessels in the limbs and trunk. A good sized blister should always be placed at the nape of the neck as a counter-irritant to prevent effusion.

The proper dose of veratrum viride in the form of the tincture is 3 drops every hour until the skin becomes moist or nausea is developed.[1] The tincture of aconite is also useful in full dose. If great arterial excitement is present venesection may be practised (see Bleeding), but veratrum viride or aconite is better, if it is at hand. Associated with these two drugs we should employ mercury and opium, the first for its antiphlogistic influence, the second for its power in allaying irritation. As a consequence we find that ¼ grain of powdered opium and ½ grain of calomel may be given every hour until the full effect of the opium or mercury is manifested. In some instances the deodorized tincture of opium (*Tinctura opii deodorata*) is better than the crude drug, in the dose of 2 to 5 drops every two hours, or less. Sometimes belladonna is of great service, and this is particularly the case where the drugs already named are contra-indicated because of a condition of weakness or asthenia. In both conditions ergot is of value in allaying the congestion, but its period for exerting a favorable effect is not at the very first part of the attack, but a little later when the stage of exudation is at hand. During the first acute stage an ice-bag should be applied to the head, both for its local influence and antipyretic effect, and leeches may be put at the nape of the neck with advantage. As the disease advances and the nervous disorders of the affection become marked, nervous sedatives are required to allay the twitchings, muscular spasms, or convulsions, and for this purpose no drugs are to be compared to chloral and the bromides.

The doses to be used vary with the violence of the symptoms, but it may be stated that the chloral should rarely, if ever, be used in doses above 10 grains, and the bromides from 5 to 40 grains. If coma comes on, a large blister should be applied to the nape of the neck.

Quinine has been recommended in meningitis, but it is absolutely contra-indicated, as it predisposes to this condition. It may only be employed in convalescence and then used most carefully.

The treatment of the second stage of meningitis must be necessarily supportive owing to the reaction consequent upon great nervous and arterial excitement. Under these circumstances the use of opium is still indicated, because it allays nervous unrest and supports the system, partly by conserving the tissues and partly by inhibiting the waste of nervous force apt to occur at this time. Alcohol should be given with the food if weakness is present, and a very simple milk diet insisted upon.

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[1] It is to be remembered that veratrum viride often causes nausea and even vomiting in susceptible persons, and in consequence must be carefully given in meningitis lest if vomiting come on the disease be made worse.

MIGRAINE.

(See Neuralgia.)

MYALGIA.

Soreness of the muscles either on pressure or on movement may be dependent upon a number of causes such as strains, bruises, rheumatic taint, or inflammation due to a cold. Here, as in many other states, the treatment is to be divided into the external and the internal methods. Of the internal remedies the best are the salicylates or iodide of potassium, if rheumatism be at the base of the trouble. On the other hand, if a bruise or cold be the cause, the chloride of ammonium will be of service in 10 or 20 grain doses given in a solution with extract of liquorice (for prescription see Bronchitis). Other remedies which may be tried with a good chance of success are full doses of a good fluid extract of cimicifuga (20 drops to 1 drachm) or the citrate or acetate of potassium in 20 grain doses.

The local medications are numerous, but only a few can be considered as worthy of routine employment. The chief one is iodine, in the form of the pure ointment or diluted one-half with lard if the skin is easily injured. Another method is to employ a liniment, well rubbed in, made up as follows:

℞.—Tr. belladon.	fʒ j.
Tr. aconit.	fʒ ij.
Tr. opii	fʒ ij.
Liniment. saponis . . . . . q. s.	f℥ vj.

M. S.—Poison. To be used externally only as a liniment.

Sometimes chloroform liniment is singularly successful, and poultices applied as hot as can be borne and covered by oil-silk and cotton to retain the heat, are often of great value. Massage or good rubbing is also a *sine qua non* of good treatment in this state.

NASAL CATARRH, ATROPHIC.

(*Synonym, Atrophic Rhinitis.*)

The atrophic or last stage of nasal catarrh, commonly known as *dry catarrh*, is a natural sequence of the stage of hypertrophy; although in exceptional instances the atrophic type has appeared from the start. Increased vascularity and over-stimulation of the hypertrophic stage lead to increased functional activity, and finally to exhaustion and atrophy of the tissues involved. (See page 492.)

In atrophic nasal catarrh the nostrils are roomy and the mucous membrane red and shiny. The formation of connective tissue has, to a great degree, obliterated the delicate serous glands, and the discharge of mucus, no longer diluted, forms inspissated crusts, which adhere to the mucous membrane of the septum and turbinated bones.

Areas of ulcerated or abraded membrane are disclosed upon removal of these adherent crusts.

The turbinated bones are gradually absorbed and the secreting surface thereby much reduced. Sometimes the wasting is so great that the posterior wall of the pharynx is clearly visible from the front. The inspissated secretion may make a cast of the nostril, and as fresh layers form underneath the oldest part is raised until the whole interior of the nostril becomes a mass of decomposition, giving rise to an overpowering stench. This form of catarrh causes loss of the sense of smell, and the odor is not recognized by the patient himself. Ulceration or caries of the bony structure produces an odor even worse than the so-called *ozæna*. The *pharynx* suffers from the general wasting and presents a dry, varnished appearance called *pharyngitis sicca*, which is rather a symptom of nasal atrophy than a separate disease of the pharynx.

The indications are the removal of all accumulations in the nose and naso-pharynx; the healing of abraded or ulcerated surfaces; the early removal of dead bone is imperative, and what secreting surface remains, as far as possible, must be stimulated to compensate, in a measure, for the glands that are hopelessly destroyed. In other words, our efforts are directed toward producing a *compensatory hypertrophy* of the glandular tissue that remains. Therefore, with the use of antisepsis we combine alteratives and local stimulation.

Cleanse the nose thoroughly with the alkaline wash—Dobell's solution—warmed to increase its solvent power. To relieve the *odor* increase the amount of carbolic acid or substitute for it eucalyptol and thymol in the wash. Listerine contains both of these and may be added to the wash. Its own pungent odor masks somewhat the offensive odor. Permanganate of potassium may be used in weak solutions, but is painful except when sensation is entirely lost. Peroxide of hydrogen is recommended, but the writer has had no experience with it over such an extensive surface.

The solutions are best applied by means of an atomizer or post-nasal syringe in the hands of the physician, or by snuffing from the hand or cup at the patient's home.

The odor, if due to decomposition, is much relieved as soon as the passages are clear. The discharge must never be allowed to re-accumulate, or much time will be lost.

Ulcerations require local stimulation by a strong solution of nitrate of silver or a superficial application of the flat surface of the galvano-cautery heated to a dull redness. Remove necrosed bone, which is often found detached in the nostril.

Judiciously combine local stimulants with alteratives. Powders of nitrate of silver in starch, varying in strength from 1 to 10 grains to 2½ drachms of the latter, may be blown into the nostrils by means of an insufflator; to cover gently the whole surface with a thin layer use it only of sufficient strength to be slightly felt. Nitrate of silver in solutions 1 to 10 grains to 1 fluidounce, at other times gives better results when applied to the mucous membrane. Avoid over-stimulating and so exhausting the glands we wish to strengthen. The use of alteratives may alternate with the silver salt and iodide of poassium, and this may be done by using solutions of *iodine* and *glycerin*, as recommended for hypertrophic nasal catarrh. *Internally*, the physician should employ iodide of potassium to increase nasal secretion, mucous membrane stimulants and tonics, and pay attention to the activity of the skin.

NASAL CATARRH, CHRONIC.

Chronic nasal catarrh is essentially a disease of civilization, which may occur at any period of life, but more commonly develops from youth to early adult life.

Although more prevalent among the upper classes, in the lower ranks it most frequently reaches its later stages and its worst forms. This does not result from lack of opportunity for treatment, but from the ignorance or indifference which this class show to diseases while there is no suffering and no interference with business.

Etiology.—It is largely due to our artificial mode of life, and its causes do not differ essentially from those which give rise to chronic inflammation in other parts of the upper air-passages, as in chronic laryngitis and pharyngitis.

These diseases may accompany or be developed by nasal catarrh, and when present have an important bearing on its treatment.

Continued exposure to the action of irritants of any kind of various substances, in the form of dust or particles floating in the air, keep the mucous membranes in a state of constant irritation. A low grade of inflammation is established, resulting in permanent thickening of the mucous membrane, of the submucous connective tissue, with dilatation or actual hypertrophy of the erectile tissue covering the turbinated bones. The swollen tissues obstruct the passage of air through the nostrils, and mouth-breathing results, with its train of symptoms.

The most common cause of catarrh is found in repeated attacks of coryza, each attack increasing the thickening of the mucous membranes and narrowing the breathing space.

Nasal catarrh, in its course, passes through three stages or periods, namely, the stage of coryza or acute nasal catarrh, and the chronic stages known as hypertrophic and atrophic nasal catarrh. (Page 490.)

Coryza, or cold in the head, is not strictly a stage of nasal catarrh, but, as stated elsewhere, is an acute inflammation of the nasal mucous membranes, generally running a definite course and terminating in recovery in a week or ten days. Its chief clinical importance, however, is derived from its tendency, when the vitality is reduced or recovery is retarded, to pass into a chronic stage which, to all intents, is identical with the hypertrophic stage of nasal catarrh. The line of demarcation is not clearly drawn between these two diseases or stages, nor can we locate with absolute certainty the point where acute coryza becomes hypertrophic nasal catarrh.

Atrophic nasal catarrh commonly develops from the hypertrophic stage, though occasionally the disease takes this form from the beginning. Its symptoms are essentially different from the other stages, being characterized by functional inactivity and derangement in place of over-stimulation in the hypertrophic stage.

Hypertrophic nasal catarrh commonly has its origin in a neglected cold in the head, or in a series of colds occurring in rapid succession, keeping the nose in a congested state until the erectile tissue covering the turbinated bones loses in a measure its power of contracting, and, impinging on the calibre of the nostrils, becomes a source of permanent obstruction to breathing.

As the disease progresses there is increased susceptibility to cold. Slight exposure produces a stuffy feeling in the nose. The nostrils may become completely occluded; usually, however, only one side at a time is obstructed at first; the obstruction showing a tendency to change sides. This change is most noticeable in turning in bed, the lower side usually stopping, and on changing the position the obstruction is reversed, the clearing being accompanied by a crackling sensation. A slight tickling cough and tendency to clear the throat in the mornings may result from irritation of the pharynx or larynx.

The nasal obstruction, generally greatest at night, causes restless, troubled sleep, while the mouth-breathing leaves the tongue dry and coated in the morning. A dull, frontal headache, due to reflex irritation from intranasal pressure, is not uncommon. Unusual irritability of the mucous membranes may result in frequent attacks of sneezing or in a free watery secretion, which is more active in cold weather, appearing as a drop of water, resembling a bead at the end of the nostril, or dripping from the nose in leaning forward.

In patients of a still more neurotic type, attacks resembling acute coryza occur without a moment's warning, and subside as quickly as they come. The nose at such times becomes stopped up to an oppressive degree, with free secretion, with or without violent sneezing.

Such attacks are precipitated by exposure to a close or impure atmosphere or to dampness, especially at dusk when the dew is falling or when the patient is fatigued. The voice becomes husky or altered in character from loss of nasal resonance. Aversion to company results, and the patient becomes morose and moody. Catarrh of the middle ear is liable to occur. Conditions of this nature occupy a position closely allied to asthma or hay-fever.

The rather minute consideration of this class of disorders is warranted by the important position they occupy on the border-land between catarrhal affections and organic diseases of the nervous system, and their important bearing in diagnosis and treatment.

During the early stage of hypertrophic rhinitis, on inspection of the anterior nasal passages, all the tissues appear red and highly vascular. Along the surface and margin of the lower, and perhaps the middle, turbinated bones the tissues are swollen and puffy, and, in severe cases these puffy bags adapt themselves to the shape of the nostril, completely closing the passage-way. This does not often completely close both sides, except during an acute attack of coryza. One or other side, as a rule, remains open, with a tendency for the obstruction to reverse sides. The nervous impression produced by examination may cause temporary contraction of and clearing of both sides, which, unfortunately, is soon as bad as ever.

The swellings, as described elsewhere, consist of cavernous blood-vessel tissue, which has the property of filling with blood and erecting, under stimulus. These swellings on the turbinated bones are known as *hypertrophies*, although at this stage they contain little hypertrophied tissue, but are, more strictly, bags of erectile tissue which have lost the power of contracting. They readily disappear upon pressure by means of a probe, but return at once when the pressure is withdrawn. Application of cocaine (4 per cent. solution) produces some contraction, benumbing and blanching the tissues at the same time.

The power cocaine possesses, of contracting hypertrophied tissue, is useful for purposes of diagnosis in hypertrophic nasal catarrh. By its use we may readily distinguish tumors, or bony or cartilaginous growths, from the erectile tissue.

The long continuation of a low grade of inflammation favors the formation of connective tissue and actual hypertrophy of the turbinated tissues, which become larger and firmer, and do not completely disappear under pressure from a probe. At the same time a progresssive increase in the nasal obstruction is observed.

A rhinoscopic view posteriorly reveals a similar state of affairs, and a hypertrophy developing on the middle or lower turbinated bone, rarely on the upper. At this position the hypertrophy appears as a round, globular tumor, extending backward toward the vault of the pharynx. It is sometimes sessile, but often has a slight constriction at its attachment to the turbinated bone. It occasionally is pale and covered with mucus—indeed, a collection of mucus may be mistaken for a hypertrophy. But cleansing the nose with a solution sprayed by means of an atomizer directed through the nose from the front, or by a post-nasal syringe from behind, clears the diagnosis.

At other times a posterior hypertrophy becomes engorged with blood, and presents a deep purple color, resembling, in size and shape, a red raspberry.

Enlarged pharyngeal tonsils produce decided obstruction posteriorly, and, by the secretion of large quantities of mucus, cause a constant feeling of fulness, with a desire to "hawk and spit."

An enlarged pharyngeal tonsil is recognized as a soft, spongy mass in the vault of the pharynx. Occasionally it hangs down in festoons which resemble somewhat *stalactites* hanging from the roof of a cave. Should one of these stalactites become eroded it may cause frequent and alarming hemorrhages.

Hypertrophy of the pharyngeal tonsil is more common in children than in adults and frequently occurs in connection with hypertrophied faucial tonsils or in conjunction with adenitis, elsewhere resulting from diphtheria or scarlet fever, or as part of a strumous diathesis.

Hypertrophied tonsil is a fruitful source of deafness in children, as it may become large enough to interfere with the passage of air through the Eustachian tube or cause extension of catarrh to the middle ear.

When a child is too small to permit a rhinoscopic examination the presence of an enlarged pharyngeal tonsil may be felt by introducing the index finger through the mouth up behind the soft palate, taking care that the finger is protected from biting by the child's sharp teeth.

It is well to educate the finger to recognize the size and shape of the naso-pharynx, although a disagreeable performance, for it may aid materially in outlining the structure, consistency, or point of attachment of tumors projecting from the nose into this space, or even assist in engaging a large growth in the loop of wire from a snare introduced through the nose. The ear should be educated to recognize the different effects produced on the voice by obstructions in the front or back of the nose and so to assist the eye in diagnosis.

Occlusion of the nostrils, if well in front, gives a *nasal* sound to the voice from the pent-up vibrations in the nose and naso-pharynx. An obstruction at the back of the nose deadens the voice, interfering with its carrying power, preventing the voice being heard at any distance from the speaker. The voice, to use a technical term, loses its *timbre*, and should it be used to any extent results in chronic laryngitis. The extra pressure injures the larynx, tires the throat, without increasing the carrying power.

The pathological changes occurring in hypertrophic nasal catarrh do not differ materially from similar changes occurring in catarrhal inflammations elsewhere. In treating catarrh, find the cause, and if possible remove it. Great assistance in this direction may follow careful inquiry into the occupation and environment of the patient.

The mucous membranes in hypertrophic nasal catarrh, as stated above, are in a condition of increased vascularity. The tissues are red and swollen, especially over the turbinated bones, where the submucous connective tissue has increased to the extent of forming one or more red puffy cushions which almost or completely obstruct the passage-way. These cushions are more or less elastic and may be pressed partly away by means of a probe, but immediately return on removing pressure. Originally composed of erectile, spongy tissue with the power of contracting and dilating, they now remain permanently enlarged or hypertrophied.

The difference between nasal catarrh and simple catarrh occurring in other places, is chiefly the result of location. The nasal mucous membranes are surrounded by bony walls which limit the power of swelling to one direction, namely, toward the centre. This affects the main function of the nose, that of respiration, and obstructed respiration leads at once to a train of symptoms, not of catarrh, but directly or indirectly the result of catarrh.

Swelling of the turbinated tissue and nasal obstruction are early symptoms of hypertrophic nasal catarrh. The change in functional activity which is caused by obstruction to respiration, and the nervous irritation resulting from pressure, sooner or later produce permanent injury, either local or reflex.

The first indications for *treatment* are the reduction of inflammation and restoration of the breathing space.

As the chief function of the nose is respiratory, the reëstablishment of free nasal respiration, combined with the liberal use of antiseptic washes, will lessen the inflammation and irritation and produce a healthier state of the secretions.

The writer places *cleanliness* at the head of the list of remedial measures. The alkaline wash recommended on page 389, sprayed into the nose by a hand atomizer, or gently snuffed from the palm of the hand or from a small cup, gives good results. The hand warms the solution slightly, but when snuffed from a cup the solution should be artificially warmed. The wash may be used two or more times a day.

The nasal douche should never be used where there is nasal obstruction, on account of the risk of forcing the solution into the Eustachian tube and causing catarrh of the middle ear.

In addition to the antiseptic wash, where the mucous membrane is congested and irritable, the treatment recommended for coryza may be instituted for a few days with good results. A solution composed of equal parts of distilled extract of hamamelis and water, or a dilute solution of hydrastis may be sprayed into the nose during the acute stage.

A little later, a spray of ferric alum, 5 grains to the ounce, or the preparation of iodoform known as "Bolton's solution," may be applied carefully, as a spray, by the physician.

It is not advisable to use alum in any considerable strength in the nose, as its continued use is liable to impair the sense of smell.

The alterative and absorbent action of *iodine* makes it a valuable remedy for local application in chronic nasal catarrh. Combine it with glycerin in the strength of 6 or 8 grains to the ounce, with enough potassium iodide to make a solution. Apply this by means of a piece of absorbent cotton on the end of an applicator, along the floor of the nose, until it reaches the pharynx. It is needless to say that such an application as this should be made with the utmost gentleness. The cotton should project beyond the probe, and care should be taken to avoid bruising the tissues.

After the acute stage has subsided, as shown by the disappearance of the livid color and lessened sensibility, any remaining hypertrophic tissue should be removed by a snare or the galvano-cautery.

NEURALGIA.

Like headache, neuralgia gives rise to most of the suffering experienced by active persons who are not sick enough for bed or who are confined to bed by other diseases. It affects members of every walk of life, and may be so severe as entirely to incapacitate the most powerful of men.

The causes of neuralgia are very various, but they may be briefly stated to depend chiefly upon malnutrition, over-work, nervous excitement, with consequent reaction, and to reflex irritation from diseased organs, as in the case of supra-orbital neuralgia from eye-strain, or ovarian neuralgia from uterine inflammation. Nerves functionally diseased are always *more* or *less* active than normal; that is, *hyper*-excited or *hypo*-excited, below or above par. In both cases they must be brought back to their normal tone by appropriate remedies, and these consist in nervous excitants and nervous sedatives. To give a nerve already depressed the additional depression of a bromide, or a nerve excited the additional excitement of strychnine is absurd.

From what has just been said it becomes evident that the physician must always determine the condition of the system of his patient, and the causes of that condition, before administering remedies.

The treatment of this disease, from its curative standpoint, may be divided into the use of tonics, nutritives, and palliatives.

Where neuralgia is associated with anæmia no hope of permanent relief can be looked for, unless iron and arsenic are used, until the anæmia is cured, and it is often necessary to combine with these drugs the use of cod-liver oil and bitter tonics. These are the cases, too, in which nux vomica or strychnine raise the depressed nerves to increased activity and bring relief. How they do this is not perfectly known, but we know enough to recognize one or two important facts. Strychnine is certainly a nervous stimulant, and is also a stimulant to the anterior columns of the spinal cord. It also acts upon the trophic centres in the anterior cornua of the spinal cord, and by stimulating these centres increases the nutrition of the tributary nerve fibres.

It is needless to state that the neuralgias of syphilis and scrofulosis are to be treated by the specific remedies directed to the cure of these causative affections, while at the same time the varying symptoms are carefully controlled by appropriate palliatives.

Where nervous exhaustion causes neuralgia phosphorus is a useful remedy, particularly in those cases which are convalescing from acute fevers.

Sometimes malarial poisoning produces a violent form of supra-orbital pain known as "brow ague," which is to be relieved, not by ordinary remedies, but by large doses of quinine.

The relief of the states producing neuralgia having been spoken of, it yet remains for us to consider the measures to be adopted for the cure of an attack. Fortunately, the recent advances of therapeutic study have placed in our hands a large list of drugs not apt to produce a habit after prolonged use, comparatively safe while yet active, and not of disagreeable taste or general effect. By these terms the writer refers to antipyrine, acetanilide, and phenacetin, all of which possess wonderful power in the alleviation of pain dependent upon true nervous involvement, but in order to avoid failure in the use of these drugs in the relief of headache we must remember always that their field of service is that of neuralgic pain, not other pains. Antipyrine is to be used in the dose of 5 to 20 grains for ordinary neuralgia, or the pain arising from the crisis of locomotor ataxia, acetanilide in the dose of 3 to 8 grains for the same purposes, and phenacetin in the same amount as acetanilide.

Upon these remedies combined with caffeine and the bromides, according to circumstances, we now depend, and the following prescriptions will be found of service:

℞.—Antipyrine	ʒj.
Caffein. citrat.	gr. xx.

M.—Ft. in chart No. x. S. One every thirty minutes till relieved.

The following may be of use also:

℞.—Antipyrine	ʒj.
Potas. bromid.	ʒiij.

M.—Ft. in chart No. x. S. One every thirty minutes till relieved.

Or when the caffeine in the first prescription causes nervousness:

℞.—Antipyrine	ʒj.
Caffein. citrat.	gr. x.
Potas. brom.	ʒiij.

M.—Ft. in chart No. x. S. One as above.

In any one of these prescriptions acetanilide or phenacetin may be substituted for the antipyrine.

An effective remedy in some cases of brow neuralgia is croton chloral in from 5 to 20 grain doses in pills of 5 grains.

A very large number of local applications have been used with success in obstinate neuralgias and other cases not so difficult of cure. Cocaine cannot be applied, as it does not penetrate the skin, but relief can sometimes be obtained by the local use of the oleate of aconitine painted over the spot if it be limited in area. Too much of this alkaloid cannot be applied, lest poisoning by absorption occur.

Where the nerve is very superficial it can often be treated by cold with great success. This is accomplished by freezing the parts with an ether or rhigolene spray, or by the application of a small package of finely chopped ice and salt. Within the last few years the treatment of neuralgia by *kataphoresis* (see p. 326) has come into prominence, and consists in the use of some local anæsthetic, such as chloroform, which is applied over the part on a small piece of lint, and a rapidly interrupted current used through the pledget. Under these circumstances the anæsthetic passes through the skin and affects the nerve.

A very useful local injection in localized neuralgia is $\frac{1}{6}$ to $\frac{1}{4}$ of a grain of morphine, but the danger of beginning the morphine habit is to be remembered when treating chronic cases. Sometimes acupuncture (see p. 297) is of service, and the surgeon may be called upon to stretch the nerve or to do a neurectomy.

There still remains to be considered a form of neuralgia generally known as *migraine*. This affection is very severe in its manifestations, and is often most obstinate in yielding to treatment. Commonly it is associated with eye-strain or cerebral disease and other similar causes, and these must be removed before a cure is entirely effected. The best treatment of most of these attacks is the use of 20 drops of the tincture of cannabis indica every hour, if a good preparation can be had, or by the use of $\frac{1}{4}$ to $\frac{1}{2}$ a grain of the solid extract every two hours.

NIPPLES, SORE.

Whenever the nipples become sore, so that it is impossible for the mother to allow the child to nurse, a solution of cocaine of the strength of 4 grains to the ounce should be applied to the part, and washed off carefully just before the child sucks. Following the nursing a solution of boracic acid of the strength of 20 grains to the ounce of water or mucilage of acacia may be used over the part, the nipple being thoroughly dried beforehand. Where the fissures are deep and slow to heal, the tip of a stick of silver nitrate may be applied to them with advantage. Other practitioners employ tincture of benzoin over the inflamed part, and a glycerite of tannin is often of value. Cleanliness, dryness, and care of the breast previous to parturition do much toward preventing the condition.

Sometimes it is necessary to use a breast-pump or nipple-shield before a cure can be effected.

OBESITY.

Whenever an excess of fat accumulates in the body as part of its substance, various discomforts, both mental and physical, arise, and, in addition, the normal functions of all the parts are so disturbed or interfered with that the continuance of health is impossible. In many cases the deposition of fat about the heart or between its fibres results in serious symptoms, and breathlessness on exertion is produced by the obstruction which is offered to the free movements of the diaphragm, owing to masses of omental fat aided by the great weight and bulk of the body requiring severe muscular effort. It is worthy of note also that a layer of fat over the body increases the vascular surface in the body very greatly, and in consequence gives the heart the labor of supplying a larger number of bloodvessels.

The causes of obesity are numerous. In many families there is an inherited tendency, while in others only individuals are affected. These persons are fat because their systems naturally tend to the deposit of obese materials in the same way that the members of one family have large bones and another small bones. The etiology of obesity, outside of the causes first named, are very numerous, but the chief one is over-indulgence in food.

Just at this point it is not out of place to state exactly what over-indulgence in food means. Every individual living is a law unto himself in regard to the amount of food which is consumed and ingested. One often sees large, powerful, wiry men, who eat little, sit beside others, not so powerful or large, who eat excessively and who apparently do not suffer from indigestion in consequence. Neither of these two groups become excessively fat, because one represents a grate which burns its fuel so that there is no waste, while the other resembles a grate in which there is always a residue of unburnt coal, which is cast out with the ashes as effete matter. As different engines of the same build burn varying amounts of coal, so do different men use different amounts of food. No stated amount of food can be set down as a man's daily portion, until his case is studied, but it is important to remember that the quantity of food is generally in direct ratio to the severity of the toil, and that a man who loafs about a club, or "takes life easy," often eats more than a day laborer, of far richer foods too, and wonders why he gets stout. In nearly every case of obesity not dependent upon gross disorder of the trophic nerves, over-indulgence in foods is the cause. To some this may seem absurd, and the patient will say that he eats just enough to keep him from feeling empty between meals, but this does not alter the case in the least. The proper amount of food for a man is not what his appetite or gastric viscus calls for, but what his system needs. To this further reference will be made when considering the diet for obesity, found below.

The very presence of fat aids in the deposition of it, for, by acting as a non-conducting pad all over the body, it prevents the dissipation of heat, and so decreases the combustion of those substances which, when not used for the manufacture of heat, are deposited as fat. Again, we nearly always find that obese persons are users of alcohol with their food, thereby increasing the fat in their bodies, for finding that they cannot digest all the substances which greediness makes them swallow, they take alcohol to stimulate their digestive apparatus to increased efforts and assimilation. Further than this, alcohol adds force to the body, and preserves the tissues by substituting itself in the oxidizing processes.

We find, therefore, that three great causes are active in producing corpulence in many cases, namely: heredity, over-indulgence in food, and lack of exercise, which is one of the means by which over-indulgence is produced—*i. e.*, less exercise, less food needed, but often more eaten.

The treatment of corpulence rests solely upon the conditions named. In all instances the diet is the important point for the bestowal of care. Reference has been made above to the fact that the needs of the system are the criterion by which we judge the amount of food necessary to each case, not the sensations in the stomach. The use of coca by the natives of South America enables them to withstand hunger and deprivation, not because it affords tissue to the body, but because it paralyzes the sensory nerves in the stomach, and relieves the sensation of hollowness or weakness which we are accustomed to overcome in this country, in the absence of food, by tightening our belts. To understand this clearly, we must recollect that the system keeps its shares of force in the same way as a careful speculator keeps his shares of stock, namely, one part in active use for speculation, the other half for reserve in case of need. In health the stomach begins to "feel hungry" as soon as the speculative shares of force are nearly used, in order to cause the ingestion of more food and to preserve the "sinking fund" intact. It becomes evident, therefore, that the mere presence of hunger is purely a symptom, not an indication of the necessity of food, for, if it were, the consumptive would be notorious for his appetite, instead of being noteworthy for his anorexia

The food of the patient suffering from obesity is to be cut down gradually, and the character of it arranged so that, though its bulk be great, its nutritive properties be small. Beef and other meats are concentrated foods containing much nourishment in a small space, while lettuce, spinach, cabbage, and nearly all vegetables, except roots or tubes contain a large amount of fibre useless to the body. By the use of a carefully arranged vegetable diet in obesity, we cut down the actual amount of food absorbed, and, by its bulk, keep the stomach so busy at sifting the nutritious from the non-nutritious materials that hunger is not felt, because another meal-time is reached almost before the food of the first is gotten away with. We find, therefore, that the diet for the reduction of corpulence may consist chiefly of bulky vegetables, but not too exclusively of any one article or set of articles. Heretofore it has been thought that proteids (meats, eggs, etc.) should be used to take the place of all hydrocarbons or carbohydrates (fats, starches, and sugars), but this is not physiologically correct, as both forms of food are always needed for health, and it has been found that proteids may be converted into fats in the body.

The following bill of fare will be found of service in obesity:

Breakfast: One or two cups of coffee or tea, without milk or sugar, but sweetened with a grain or two of saccharin. Three ounces of toasted or ordinary white bread or six ounces of bran bread. Enough butter may be used to make the bread palatable, not more than one ounce. Sliced raw tomatoes with vinegar, or cooked tomatoes without any sugar or fats. This diet may be varied by the use of salt or fresh fish either at breakfast or at dinner.

Noon meal (dinner): One soup-plate of bouillon, consommé, St. Julien or other thin soup, or Liebig's or Johnston's beef essence, followed by one piece of the white meat of any form of bird or fowl. Sometimes a small piece, the size of one's hand, of rare beef or mutton, but no fat, may be allowed, and this be accompanied by string beans, celery stewed or raw, spinach, kale, cabbage, beans, asparagus, leeks, and young onions. Following this, lettuce with vinegar and a little olive oil (to make a French dressing), a cup of black coffee or one of tea and a little acid fruit, such as some sour grapes, tamarinds, and sour oranges, or lemons, may be taken, and followed by a cigar or cigarette.

Supper should consist of one or two soft-boiled eggs, which may also be poached, but not fried, a few ounces of bran bread, some salad and fruit, and perhaps a glass or two of light, dry (not sweet) wine, if the patient is accustomed to its use.

Before going to bed, to avoid discomfort from a sensation of hunger during the night, the patient may take a meal of ponada or soak Graham or bran crackers or biscuits in water and flavor the mass with salt and pepper.

The reduction of diet is generally best accomplished slowly, and should be accompanied by measures devoted to the destruction of the fat present for the support of the body. Thus the patient should not be too heavily clad, either day or night, should use exercise, daily becoming more severe, and should drink freely of water, provided that sweating is established sufficiently freely to prevent the accumulation of the liquid in the vessels and tissues.

Very often a cold bath will, by its disipation of heat, cause destruction of fat, which will be burnt up in the body in the manufacture of heat units to maintain the temperature, and if the patient is not too anæmic and stands cold well, they should be repeated each day, or a Turkish bath used instead.

The bowels should be kept active by laxative fruits or purges, but if liquids taken in drink are not eliminated rapidly, saline purges are useful, since if the bloodvessels are engorged, the circulation in the capillaries is slow and a deposit of fat is apt to result.

Where proper exercise is impossible, massage, electricity, passive exertion, and an absolute skimmed-milk diet may be resorted to, particularly in those persons known as "fat anæmics" who have not enough red corpuscles in their blood to carry sufficient oxygen to the tissues to complete oxidation.

PERICARDITIS.

Inflammation of the pericardial sac is a frequent occurrence, and requires prompt treatment. If the case be sthenic and is seen early, five to ten leeches may be placed over the præcordium, and at the same time sufficiently large doses of veratrum viride resorted to, to impress the circulation, and by the dilatation of the bloodvessels to draw off the blood from the inflamed area.

Where the case passes from the acute stage of inflammation to that in which effusion takes place, the treatment changes at once, and becomes supportive if the system shows signs of failure. The friction sounds of the first stage are now lost and the heart sounds may be feeble or muffled in tone, by reason of the effusion present. To prevent the outpouring of a plastic exudate capable of undergoing organization and forming adhesions, calomel should be given in $\frac{1}{2}$ grain doses every hour, combined with enough opium to prevent purgation. Digitalis, alcohol, or caffeine may be used if the heart shows signs of failure, and if the effusion is sufficient to endanger life, it should be tapped and aspirated away very gradually. In other cases it is only necessary to administer hydragogue purges, such as jalap, 20 grains of the compound jalap powder, or elaterium, $\frac{1}{8}$ grain, or a saline purgative in concentrated form, before breakfast. Often a blister over the præcordium is of service.

PERITONITIS, ACUTE.

An inflammation of the peritoneum, as in the case of any serous membrane, may be either sthenic and fibrinous or asthenic and serous. The same rules hold therefore in this case as in all forms of inflammation, namely, that circulatory depressants are only to be used in the first type and followed, if needed, by stimulants; whereas, in the asthenic class the use of stimulants is called for at once and depressants are contra-indicated. For many years the profession have recognized opium and belladonna, particularly the former, as the most universally applicable remedies and best curative drugs, for cases of peritoneal inflammation, and while a new school of treatment in this disease has arisen, it has only proved itself of value in a number of cases.

Remembering constantly that peritonitis is an inflammation, and as an inflammation therefore must be so treated, the course of treatment pursued by the physician is by no means complicated. While the use of veratrum viride may be resorted to, where the patient is strong and the pulse hard and tense, aconite may perhaps in such cases be better for the double reason that vomiting is apt to occur of itself and may be induced by the veratrum viride, while aconite decidedly prevents any such tendencies. This is important in view of the fact that vomiting always is to be avoided, lest the retching increase the peritoneal inflammation. If vomiting is present, it and the pain should be controlled by the use of large doses of opium and belladonna, say ¼ grain of the extract of each to an adult, and be accompanied by the application of leeches to the abdominal wall in large numbers amounting to 10 to 30. If these cannot be had, a mustard plaster may be used. If the vomiting is too severe to take the drugs by the mouth, they must be given by the rectum in ½ pint of starch-water, laudanum and the tincture of belladonna being employed in the proportion of 1 drachm each.

Opium is always well borne in full dose by those suffering severe pain, and it seems to be particularly well borne in peritonitis. The use of the drug here, as everywhere else in medicine, is not governed by the amount in grains which has been used, but by the effects which it produces. These drugs, unlike the depressants and stimulants, may be used in all forms of peritonitis and in all stages if called for, but the leeches and counter-irritation are limited in their use to the early periods of the attack.

The use of calomel in peritonitis is highly praised by some and decried by others, largely because its proper sphere is not recognized. Mercury does good only in the severe, acute forms of peritonitis where the disease arises from traumatism or other cause and is not to be used for the liquefaction or changing of a fibrinous exudate into an exudate incapable of undergoing organization.

The remaining directions are absolute rest, which is nearly always adhered to voluntarily by the patient owing to the pain, and the use of small quantities of predigested—that is, pancreatized milk—given frequently.

Often in peritonitis the inflammation extends to the bowels and paralysis of their muscular fibres occurs. As a result of this, obstinate constipation ensues which is not to be overcome by purges, which if mild will not act, and if severe are dangerous, but by the use of belladonna and opium already spoken of. The rationale of this treatment in the light of our present physiological knowledge is not far to seek. Belladonna acts as an antispasmodic upon all unstriped muscular fibre, and in the large doses here given depresses the peripheral ends of the splanchnic or inhibitory intestinal nerves. In this way the muscular fibres which are in spasm are relaxed and the peristaltic waves set free. The value of the opium also is apparent, for it allays irritation and prevents the reflex muscular spasm dependent upon the pain and inflammation. Obstinate constipation after the ingestion of irritant foods, such as putrid meat, will often be relieved by opium and belladonna as effectively as if the patient was purged by an ordinary purgative.

Very frequently in acute peritonitis tympanites becomes not only a very painful, but even a dangerous symptom, the distention of the belly being very great. This may be greatly relieved by the employment of turpentine stupes (see Turpentine, p. 288), and in some cases by the rectal injection of milk of asafœtida, or better still, turpentine, 1 drachm; milk of asafœtida, 3 ounces, and warm water, 4 ounces.

Not content with having made a vast stride forward during the past few years, abdominal surgery brings with it not only new methods of treating diseases in this region by the knife, but also has given us a method of curing peritonitis by the use of saline purgatives which is certainly of the greatest value in those sudden inflammatory conditions which occasionally spring into life after operations upon the abdominal area. It will be remembered that Mr. Lawson Tait has been the chief advocate of this treatment for several years, and that the wonderful results which he obtained, the reputation of the reporter, and the complete reversal of all our ideas concerning the treatment of the disease, have called forth not only an enormous number of trials of the method in this country, but have also brought forth two opposing factions in the profession. The first of these is chiefly composed of surgeons, the second of persons who in a long experience have reached good results by older methods, and who are generally physicians. The first class dogmatically assert that the physician should turn over every case of peritonitis to the surgeon to be opened, searched, and purged; the second class do not deny that saline purgatives do good in the hands of the surgeon, but are more conservative in their opinions concerning the general measures in all cases of peritonitis.

Again, it would seem impossible at the present time to assert that peritonitis may be either idiopathic or traumatic without bringing upon one's head a storm of criticism, for on the one side we have a number of physicians who believe the peritonitis may arise without any direct exciting cause, and on the other hand an equally large body of observers who assert that it is essentially a secondary inflammation brought on by direct contiguity with an already inflamed tissue, or else that the inflammation is set up by the escape of foreign bodies into the peritoneal cavity, or by pathological changes occurring in organs normally situated in these regions, as for example, fibroid enlargements of the uterus with impaction in the pelvis, or pyosalpinx.

As it is absolutely impossible for either side at present to prove that their opponents are wrong, and as both sides are not to be doubted in the integrity of their observations, the unbiassed judge can but come to the conclusion that, as yet, we have a right to believe that idiopathic peritonitis may exist.

If those observers are correct who believe that no peritonitis arises, save as the result of some one of these conditions, then the attempt on the part of the physician to treat such a case is criminal negligence, and, as such, cannot be too severely condemned; but too many cases of peritonitis are to-day walking examples of the value of the use of opium to permit of anyone asserting that this treatment is useless, or that the knife of the surgeon is to be used in every case; yet some of the more positive members of the profession would have us believe that the abdomen should be opened solely for the purpose of making a diagnosis, and that this having been done, and no intestinal complications found, salines given.

Whether the inflammation be idiopathic or not has little to do, however, with the methods which we are to resort to in the medical treatment of this condition. It cannot be gainsaid that the results obtained by surgeons in the use of saline purgatives have been startlingly brilliant; neither can anyone deny that their methods may sometimes be employed in medicine as well as in surgery; but there are several points to be recalled by both parties which we think so seriously modify the views of each as, after all, to unite them in a bond of unanimity. No one denies that the surgeon does right when he uses salines to prevent peritonitis after an operation, but the knowledge of the condition of the patient after he has been operated upon by the surgeon, and that possessed by the physician when called to see a case of peritonitis, are radically different, for the surgeon has a right to believe that the intestinal canal is patulous and devoid of impactions and intussusceptions, while the latter knows not whether he has before him an inflammation of the peritoneum without intestinal involvement or inflammotion dependent upon some abnormality in the prima via. As a consequence it is perfectly proper for surgeons to administer salines which, to use their own words, not only deplete the abdominal bloodvessels, but also by the increased peristaltic movements produced, prevent adhesions; while the physician in the case of peritonitis from perforation, impaction, or intussusception, may do the patient an immense amount of harm by such a procedure long before it is possible to decide what the cause of the trouble may be. It is evident, therefore, that the opium treatment must be adhered to, at least until the diagnosis is formed, unless at the very first sign of pain an exploratory incision is made instead of using those remedies generally employed in ordinary attacks of abdominal discomfort; and it should not be forgotten that pain and tenderness with inflammation are the symptoms of peritonitis, not only after section, but also of many other states in the ordinary individual.

It is also evident that other conditions may exist which render the administration of purges unjustifiable, and in which the use ot the knife by the surgeon is not to be thought of. It is undeniable that the surgeon should be summoned the moment a suspicion of perforation arises, but in the case of a person in whom an enteritis has arisen locally by an old adhesion, increased peristaltic movement is equivalent to strapping the normal side of the chest in pleurisy with the object of giving the diseased side more exercise.

Again, it is of the gravest importance that both the physician and surgeon should distinguish very clearly between an inflammation of the peritoneum in a strong, healthy person, and in one who is in a condition of vital depression, or exhaustion from prolonged disease elsewhere. Depletion by means of purges is, of course, in the first class, as much indicated as the application of leeches or bleeding, but in the second class, quite as strongly contra-indicated. In the dynamic form of inflammation there is danger of adhesions being formed by reason of the fibrinous exudate thrown out; in the adynamic condition of inflammation there is already an enormous exudation of serum into the abdominal cavity which purges cannot remove until they have drained off a large amount of liquid from the blood.

Again, there are some cases of peritonitis which are ushered in by an acute paroxysm of pain, but which do not continue during their whole course as dynamic cases, and in which depletion at first results in exhaustion later on.

Until the profession have employed these two methods side by side, with an absolutely unbiassed opinion, for a long period of time, the only proper conclusion to be reached seems to us to be this, namely, that in acute peritonitis, suddenly lighted up in a surgical case, and which is recognized almost at the moment of its birth by the ever-watchful surgeon, who is on the lookout for it, and salines given; whereas, in the case which the physician rarely sees till hours have elapsed, and in which grave doubt exists as to the cause of the trouble, opium and external methods of depletion must be resorted to.

PERNICIOUS MALARIAL FEVER.

This is one of the most acutely dangerous diseases known to man, if it be fully developed, and requires the greatest activity and skill on the part of the physician, who may be called upon to treat a large number of widely varied symptoms, all of a pressing nature, at one and the same time. The chief indication is for the use of quinine, in its most soluble forms, in solution and in large doses which may amount to 60 or 100 grains, by the mouth, by the bowel, and hypodermically. (See Intermittent and Remittent Fevers.)

The manner in which quinine acts in malarial poisoning is now generally conceded to depend upon its influence over the malarial germ of Laveran, which has been so well studied in America by Osler and Councilman. All the students of the subject have found that at least some of these bodies are made inactive and disappear under the influence of the drug, and we have at last obtained a knowledge as to the manner in which quinine does good, which in its absence was a constant opprobrium to scientific medicine. The saying that "As soon as the physiologist and pathologist tells the therapeutist what disease is, the latter will tell how his remedies do good," is very well exemplified by the use of quinine in malaria and the present well-founded scientific reasons for its employment.

PLEURITIS, OR PLEURISY.

Under the consideration of Peritonitis, the writer has already given so full an account of the treatment of acute inflammations affecting serous membranes or surfaces capable of throwing out a croupous or fibrinous exudate, that it seems scarcely necessary to repeat the directions here. It is to be remembered that an inflammation of the pleura is the same condition here as an inflammation anywhere, and the treatment of this state in its early stages is identical, or, in other words, the use of venesection, or, better still, of tincture of veratrum viride or aconite to bleed the man into his own blood-vessels is to be resorted to. Along with these measures, counter-irritation in the way of blisters, or depletion by wet cups is in order; but dry cups are never to be used in pleurisy over the diseased area, since they may produce ecchymosis of the pleura by their suction exercised through the intercostal spaces. Where dry cups are used they should be employed at some distant spot, as over the skin of the back, where the tissues are too dense to permit of pleural involvement. In cases which are very sthenic it is best to give calomel for its aplastic effect, in order to prevent a fibrinous exudate. By this treatment nearly every case of pleuritis, if seen early enough, can be aborted.

When the second stage of pleurisy, or the stage of effusion, is reached, other lines of treatment are needed. The cardiac sedatives have been stopped as soon as the quieting of the circulation, the lessening of pain, and the absence of a friction-sound denote the passage of the case from one stage to the other. If the pulse becomes weak and the system is depressed, stimulants in the form of alcohol or digitalis are needed, and special care must be devoted to the condition of the exudation in the pleural space. If it is sufficiently large to cause dyspnœa on exertion, and is not readily removed by the administration of saline purges in concentrated form at the proper times, or if it is not taken up by the vessels after jalap or elaterium are used, then resort must be had to aspiration of the liquid by the proper apparatus. The physical signs at this time, it will be remembered, consist in flatness on percussion over the lower portions of the chest, which area of flatness generally varies with the changes in the position of the patient from the erect to the recumbent position, unless the effusion is sacculated, and the presence of blowing or bronchial breathing in the apex of the chest, where the lung is compressed upward by the fluid below it. During this stage of effusion blisters are often very useful in aiding the absorption of the liquid present.

PLEURODYNIA.

This condition being one of intercostal neuralgia, its treatment may be carried out according to directions given under the heading Neuralgia.

PNEUMONIA.

It is of the greatest importance that the physician should employ drugs in this disease at the proper stage, in the proper dose, and with definite ends in view. In the beginning of a pneumonia of the croupous type the state of the patient is utterly different, as a rule, from that of an individual attacked by the catarrhal form of this disease. The first generally attacks a person possessing sufficient vitality and force to cause him to suffer an acute inflammation of the tissues involved. In other words, the balance of health being destroyed systemic disturbance is far greater than if less vital force was misdirected from its proper functions, and as a consequence high fever with increased and excessive arterial tension rapidly asserts itself, the changes in the circulatory system being produced both directly by the diseased processes and indirectly by the heat of the body acting as a stimulant to all its functions. In catarrhal pneumonia the systemic changes are, as a rule, somewhat different, since the patient is more frequently already suffering from some predisposing disease, such as whooping-cough, bronchitis, measles, or similar affections. If the patient is still in good condition the fever and circulatory excitement may be equal to that occurring in the croupous form, but even if this be so, there will always be found *symptoms of lowered vitality* which must modify the treatment in the early stages of the attack.

Under the head of Exhaustion and Depression the writer has already defined the differences between these states, and they have been individually described. It is important to emphasize that many diseases, taking pneumonia as an example, may be produced in two entirely different ways, or in two states of the system diametrically opposed to one another. On the one hand, we have a pneumonia attacking the lung of a strong and healthy individual who may be exposed to cold; on the other, a pneumonia may attack an invalid recovering from typhoid fever or other exhausting disease, such as any one of the exanthems or phthisis. The question of the presence of pneumonia is of course to be decided, but the state of the system is to be the guide in the treatment. In the perfectly healthy man, who has pneumonia, exposure to cold upsets the normal balance and the *full force of his system runs riot and must be reduced to its proper level.* In the weakly individual the curve of health has fallen below the normal line and must be raised until it is regained. In a sthenic pneumonia there are three stages of treatment: (1) The depressant or abortive stage, and if this fails, (2) the supportive, followed finally by (3) measures for the relief of the recovering lung in convalescence. In asthenic adynamic pneumonia we must omit all depressant treatment and resort at once to the second or supportive measures. The remarks which immediately follow, it is to be remembered, have only to do with the so-called first stage in sthenic cases.

If the patient shows symptoms of weakness, as evidenced by the pulse and other signs of disease, the treatment is to be considered under the second stage.

It should be remembered, however, that the mere fact that either stage of the disease is in existence should only lead to a most thorough study of the indications present.

Primary Stage.—The primary stage of a pneumonia consists in an increase in the calibre of a larger or smaller number of the bloodvessels so that congestion occurs, the blood stagnates and an exudation ensues. We have, therefore, a state of the vascular system in which all the bloodvessels of the body are tense, except those which are relaxed by the inflammation in the lung, and the blood flowing in the direction of least resistance still further stagnates in and engorges the diseased area. All this occurs in the first stage, and it is the object of the physician so to relieve the over-pressure in the general system that the blood will leave the lung in order to obey the law of resistance which has originally caused it to accumulate in this locality.

In those instances where the diseased process goes on still further into what is known as the second stage, or that of consolidation, the indications are at once reversed and the change from the proper plan of treatment for the first stage to that necessary for the second may be required very promptly. The stagnation of the blood, combined with the pressure exerted by the rapidly forming exudate, not only narrows the patulous vessels by its pressure but so prevents the expansile movements of the lung that proper pulmonary circulation cannot occur. As a consequence the right side of the heart is distended at first and exhausted finally by the resistance offered to the blood-stream which it is forced to propel, and is simultaneously fed by blood which, by reason of the deficient respiration of the patient, is loaded with an excess of carbonic acid. Under these conditions the circulation must be so strengthened as to be able to force the issue and support the heart in its effort to overcome the obstruction.

The methods which may be resorted to during the primary stage are very numerous, but there are only two which can be recognized as of great value, while the other procedures are but subordinate measures. These two measures are bleeding and the use of such drugs as our clinical and physiological knowledge tell us are proper. The discussion of bleeding as a therapeutic measure will be found on page 326, and it will readily be seen that the abstraction of blood from the entire system will rapidly relieve the diseased lung. The second, and by far the best method, is by the use of veratrum viride, aconite, and antimony, and perhaps several other drugs of a similar class.

In adults veratrum viride will be found far more useful than aconite, while in most instances the reverse will hold true in children, in whom aconite always exercises a far more wholesome influence than any other drug of this class. Supposing that the disease be in the adult, let us for the moment consider why veratrum viride in this first stage is so useful a medicament. It will be remembered that the two alkaloids, jervine and veratroidine, possess different influences, and that between them they fulfil every object which is sought after. According to the experiments of Wood, jervine is a most powerful vaso-motor depressant, relaxing to a remarkable degree the walls of the bloodvessels everywhere, and not only does it do this, but, at the same time, so quiets the heart by an action over its muscle or ganglia as to reduce its force, thus preventing engorgement of the lung, while veratroidine by stimulating the inhibitory nerves of the heart also slows its beat, fills the ventricles, and allays excitement.

Further recollection of physiological facts shows us that the bloodvessels of the abdomen are capable of holding all the blood in the body, and into these will flow the major portion of the fluid which is filling the pulmonary vessels, at once lowering blood-pressure very greatly everywhere, so that the lung is starved of blood without dangerous engorgement taking place in the abdomen.

The manner of using veratrum viride is a good example of the necessity of careful physical diagnosis and a clear idea of what one is about to do. Used at the proper time and in the proper amount it is most useful, but when abused it is dangerous or disappointing, according to the carelessness of the physician. The following case is in point: A. E., aged twenty-five, brakeman, always strong and well, was much exposed to wind and snow after having been thrown into a profuse sweat by coupling a large number of cars. He had a severe chill that evening, ushered in by a cough and followed by fever and a sense of oppression with somewhat hurried breathing and pain in the side. At the time of admission, three hours after the chill, he had a temperature of 103° F., the eyes were bright, the expression of the face slightly anxious. Physical examination showed exaggerated breathing over the entire right side, while at the base of the left lung posteriorly there was marked bronchial breathing and dulness on percussion. Fine râles could now and then be heard, but were not constant. The pulse was full and bounding. This man was at once given 3 drops of the tincture of veratrum viride every two hours until such a time as he complained of faint nausea, and his pulse was found to be no longer rapid and bounding, but soft and slow, while the skin was moist and relaxed. The sense of oppression disappeared, the expression of anxiety passed away, no pain was felt in the chest, and the attack was aborted.

The employment of veratrum viride in this instance took place at a period in which it was possible to quiet the inflammation by "bleeding the man into his own vessels," and if it had been used later would have done more harm than good, as we have already shown when discussing the state of the inflamed part at the commencement of the second stage, and to which we shall refer later on when speaking of the treatment of that stage.

The advantages of veratrum viride are its completeness and rapidity of action, the fact that it preserves in healthy bloodvessels the blood which may be needed in the crisis if the disease is not aborted, and lastly, its safety[1] is a point largely in its favor.

The use of aconite in pneumonia is of particular value in children, in whom the emetic effects of veratrum viride often prevent its being pushed to a sufficient degree to permit of an effect on the circulation. The indications for its employment are identical with those already named when speaking of the use of veratrum viride, and the only question which arises is as to whether its physiological action and clinical record justify its use. In reply to such a query the answer may be that it does act favorably in pneumonia, but that it is not as thorough as other drugs. The studies of Ringer, Achscharumow, Boehm, and Wartmann all prove that the drug is a distinct cardiac depressant, but there is no reliable evidence to prove that it exerts any vaso-motor influence, the fall of arterial pressure being produced only by the decreased action of the heart. On the other hand, there can be little doubt that clinically the arterial pressure seems decreased by the drug. It at once becomes evident, however, that while its influence is for good in pneumonia, it does not possess the scope of action which makes it desirable in every case, yet its powers of producing nervous quiet, allaying vomiting, or meeting some idiosyncrasy make it a drug always to be thought of in this disease. Antimony, although at one time used very largely in the treatment of pneumonia, has very properly ceased to be so commonly employed, chiefly for the reasons that it is a poison capable of producing decided morbid changes in the tissues, seeming to deprive them of their vital power for long periods of time, and that it often induces nausea of a distressing type, or even vomiting, before it can be pushed to a sufficient degree to cause the desired circulatory depression. Next to veratrum viride it holds a more useful position in extremely sthenic cases than any other drug, and may be used if the patient be unusually robust. Unlike aconite, which expends its chief action on the heart, this drug not only quiets and slows the pulse by an action exerted directly upon the heart muscle and its motor ganglia, but in addition markedly affects the vaso-motor system, thereby aiding in causing the desired fall of arterial pressure. The proper dose of tartar emetic is $\frac{1}{12}$ grain repeated every two hours till the skin shows moisture, nausea asserts itself, or the pulse shows sufficient relaxation.

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[1] Both veratroidine and a resin contained in veratrum viride are powerful emetics, so that upon the ingestion of a poisonous dose of the drug so much is generally vomited that recovery spontaneously occurs. The symptoms produced are said to yield to treatment with remarkable readiness.

Gelsemium has been highly recommended by Bartholow in the treatment of the early stages of pneumonia, but is certainly of very inferior influence, and is at the same time a dangerous drug. The use of chloral has been attempted, but its other powers so dominate its action on the circulation as to make it useless for the purpose before us. There can be little doubt of the value of *pilocarpine* in the very earliest stages of the malady. Given in full dose hypodermically it will produce so profuse a sweat and so great a lowering of arterial pressure as materially to relieve the congested lung. Its value, however, depends upon its very early employment, and it should not be used if any tendency to true consolidation has already asserted itself.

The application of cold to the chest in the early stages of pneumonia has been resorted to very largely in Germany by Liebermeister, Niemeyer, and others. It is said that the dyspnœa is decreased at once, and the pain lessened. Bartol and Ziemssen speak of it highly in the croupous pneumonia of children, but the writer would fear to use it in any such instance, unless the child was above puberty and very strong.

If cold is used it should be employed as an ice-poultice made of cracked ice and sawdust, mixed and sewed up tight in an oil-silk bag in such a way as to prevent the bed and clothes from becoming wet. At this period, too, very distinct effects can be exercised over the bloodvessels of the lung by irritation of the skin, which results in the reflex wave already spoken of under Counter-irritation

The last and most active means of producing this counter-irritation is by the use of the dry cup. The wet cup may be used to deplete or bleed the patient at the same time that it acts as a counter-irritant, but in many instances the dry cup will suffice. If the counter-irritation is to be thorough the cups should be applied to the number of five or six, scattered over the area involved and a little to the sides of the diseased patch.

Mustard may be employed and a turpentine stupe (see Turpentine) or cayenne pepper be used as counter-irritants. The latter is at once one of the most efficient and least dangerous irritants, as it produces much reddening and irritation, but does not destroy or burn the skin.

The treatment of the second stage of pneumonia, when of a sthenic type, is much more difficult and hazardous than the treatment of the first stage. The question as to the line separating the first from the second stage must be clearly answered in the physician's mind, and distinct indications must exist for the employment of measures suited to the disease at this period of its development. The physical signs in the chest are only of value as evidencing the progress of the local diseased process, and only indirectly indicate the use of a given line of treatment, while the state of the pulse, the color of the skin, more particularly of the face, the duskiness of the nails, along with the rhythm of the respirations, tell the physician how the patient is standing the strain. This is not the place to discuss the possible causes of death under these conditions, but to indicate clearly what is to be done (when the flagging to and fro pulse indicates arterial starvation, while the dusky skin and pulsating jugulars show venous engorgement and distention of the right side of the heart. The employment of digitalis is here of the greatest service. It should be given in 5 drop doses of the tincture every four hours, and be accompanied by $\frac{1}{20}$ of a grain of strychnine three times a day, or oftener, as the case may require. If the digitalis is carelessly given, and its effects are not watched, it may be found to produce so rapid and irregular a pulse at the wrist as to give one the impression that the heart needs still further doses of the drug, but if the ear be placed over the præcordium under such circumstances the violent apex beat, diffused thrill, and accentuated heart sounds, will show that this viscus is over-stimulated, and that the drug should be withdrawn until some hours have elapsed, and its need evidenced by a condition of *real* cardiac enfeeblement following a stage of marked improvement due to the temporary withdrawal of the drug.

Having recommended these drugs in these states, let us study why they do good and the reasons for their use. According to a mass of experimental evidence, which by its very volume is incontestable, digitalis acts upon the heart muscle as a most powerful stimulant, increasing the force of contraction in the cardiac walls and driving the contents of the ventricles out into the pulmonary artery and aorta with an unmistakable increase in arterial tension. The experiments of Boehm showed that the heart does actually more work under digitalis, and these studies have been confirmed by Williams. Francois Frank agrees with Williams in the belief that this increased force is due to improved tone of the cardiac muscle. These facts indicate the *raison d'être* of the use of digitalis in the second stage of pneumonia, since it enables the right side of the heart to send the venous blood to the general arterial system and prevents the over distention of the right ventricle. When we remember, on the one hand, that all muscular fibres rapidly become paralyzed by over-distention, and, on the other, that digitalis produces a systolic contraction of extreme completeness, we can readily see how, by the entire emptying of the ventricle at each contraction, distention is impossible. It seems probable also that the pneumogastric nerves are the trophic nerves of the heart, and that in consequence its nourishment is improved by their stimulation by the digitalis. (See articles on Heart Disease and Digitalis.)

There are other reasons, however, why digitalis should be used at this time, which are only second to those just named. The heart-beat under its influence is greatly slowed, and by means of this slowing becomes a cool-headed man instead of a flurried, nervous, irritable invalid. By its very slowing it finds time to carry out all its functions regularly, and with "all its might," it does not exhaust itself by fruitless effort, and accomplishes far more than when it is irregular, and uncertain as to whether it is to contract or expand. That digitalis slows the pulse by a stimulation of the pneumogastric nerves has been proved beyond all doubt, and the remembrance of the fact that these nerves are respiratory in function as well as cardiac, clearly indicates the value of this influence. They supply motor fibres to the muscular coats of the entire bronchial system, the tonicity of which is most important for the well-being of the lung, since by this means the quantity of air admitted to the vesicles is equalized and the excessive use of the healthy vesicles prevented. Longet asserts that the "lung tonus" during increased tension (which is present during pneumonia) depends solely upon these muscles and their proper nerve supply. These assertions are once more supported by the experiments of Graham Brown and Roy, which prove that the vagal filaments are to the lung and its air streams what the vaso-motor nerves are to the circulatory system, dilating or contracting the bronchial tubes as may be necessary. Digitalis by stimulating them increases their tone and supports them when strained. The assertions of Schiff, that the vagus is the vaso-motor nerve of the lungs is only partly true and is so doubtful as to prevent any value being derived from this fact, so far as the blood supply is concerned. Another way in which digitalis does good is often overlooked. The respiratory centre is governed solely by the condition of the blood. If this fluid be overladen with carbon dioxide it sends out more impulses and rids itself of the gas by the increased respiratory effort; or, if an excess of oxygen is present it sends out fewer impulses until the normal balance is restored. It is also to be remembered that Marckwald has proved that the pneumogastric nerves are the regulators of the impulses sent out by the respiratory centre, so that a perfect rhythm is obtained. The asphyxia due to a partial laming of a lung by pneumonia increases the number of respiratory efforts, and in consequence the labor of the vagus is increased. Very commonly we see cases of pneumonia in which the breathing is hobbling, with a distinctly altered rhythm, now fast, now slow, now full, now deep, in which the breathing becomes regular and quiet after digitalis is used in the proper amount, a result often accorded to the cardiac influence of the drug, but largely due to its effects on the respiratory portion of the vagus nerves. The same advantages are gained by a regulated respiratory effort on the part of the lungs, as are obtained in the case of the steadied heart.

In those cases where digitalis is pushed too far these favorable effects are replaced by the most unfavorable conditions as has already been described in the discussion of this drug in heart disease. Here as elsewhere over-stimulation is as bad as lack of proper tone.

Strychnine is used to carry out an object supplementary to that of digitalis, for it has been proved to be one of the most reliable and powerful stimulants that we have upon the respiratory centres, which are apt to be exhausted by rapid breathing. It also prevents general nervous depression and aids in the maintenance of a circulatory balance by its effects on the vaso-motor system and heart muscle.

The employment of alcohol in the second stage of pneumonia is based upon the same principle as is the use of digitalis. It is inferior to the latter drug because it stimulates the heart without giving it any more strength. That is to say it stimulates and causes the expenditure of all the power the heart is capable of but does not replace the power so expended. Further than this it possesses the disadvantage of acting a comparatively short time, dose for dose, and tending to cause cerebral excitement or heaviness if it is pushed to the point of stimulation required by the heart. In persons addicted to its excessive use it either fails to act, produces effects the contrary to those desired, or actually aids the diseased process. The danger of forming the alcoholic habit is also to be remembered.

Having detailed this treatment of the second stage, that for the third stage is to be considered. For the thorough understanding of this we should remember that it consists in the breaking down or resolution of the exudations and in their absorption and expulsion from the chest.

At this time the entire diseased area is crowded with secretions which have been formed, dead epithelial cells and all the morbid substances which have accumulated. The local surfaces are depressed by the reaction following upon the excitement of inflammation, and their tone is below par. The object of the physician must be to stimulate these areas so that they may throw off the old and take on a new functional activity, and for this purpose remedies are to be used which will soften deposits and stimulate depressed vesicles and bronchial tubes.

By far the most valuable class of drugs to be here employed are those which will increase the secretions from mucous membranes without acting as cardiac depressants. Antimony is a remarkable drug for the production of a large secretion, but is often too depressing to the heart after its prolonged strain. Under the consideration of bronchitis the action of these drugs will be found more thoroughly explained, but it will suffice to point out, at this time, the method of their administration.

First and foremost stands the chloride of ammonium, a drug whose elimination takes place chiefly through the lungs, and acts most happily in aiding in the loosening of the cough and secretions. Its only disadvantage is its salty taste, which in many cases renders it disagreeable to the patient, while its irritant properties may disorder the action of the stomach, although if this organ is depressed and atonic this drug often improves its condition. The drug may be given in compressed pills, or, what is far better, in such a mixture as here follows:

℞.—Ammon. chloridi . . . . ʒij.
Ext. glycyrrhiz. . . . . ʒij.
Aq. dest. . . . . q. s. f℥iij.

M.—S. Teaspoonful in water every four hours during the day.

If the cough be in excess of the expectoration, that is, if the cough often fails to bring up phlegm and is due to tickling or irritation, it may be relieved by the addition of a little morphine to the mixture, as follows:

℞.—Morph. sulph.	gr. j or ij.
Ammon. chloridi	ʒij.
Ext. glycyrrhiz.	℥iij.
Aq. dest.	f℥vj.

M.—S. Dessertspoonful every four hours.

If more morphine than this be used it will tend to stop secretion.

When the chloride of ammonium fails to act favorably, the carbonate may be called into use for its local and circulatory action, and, in addition, the bromide of ammonium may be employed to allay the cough if morphine cannot be used. The following prescription is valuable:

℞.—Ammon. chlorid.	ʒj.
Ammon. bromid.	ʒj.
Ammon. carbonat.	ʒj.
Ext. glycyrrhiz.	℥iij.
Aq. dest.	q. s. ad f℥vj.

M.—S. Dessertspoonful every four hours.

For other remedies for this stage, see page 364 (Bronchitis).

In the beginning of pneumonia a blister should not be applied immediately over the congestion, but a little to one side, as it may increase the congestion if placed over the diseased area. When resolution begins the blister may be placed over the exact spot to aid reparative changes.

So far the treatment given has dealt with a routine case; let us suppose that things run less smoothly and complications arise. It will be impossible, in a book on therapeutics, to explain the causes of all the dangers which may present themselves; one of the most common of these is an increase in the area of the consolidation or its development elsewhere, or, in other words, a second attack superimposed on the first. The treatment of this most dangerous state of affairs requires the greatest care, skill, and intelligence, and consists primarily, not in the use of cardiac sedatives, but in the administration of digitalis and stimulants, in order to drive out the blood from the new congestion, or to enable the system to bear the strain. A blister or dry or wet cup applied thoroughly a little to one side of the spot involved, may aid in its removal, the application of mustard plasters to the feet is indicated, or a turpentine stupe may be applied to the entire chest. The use of expectorants stimulating to the lungs, if they are being employed, is to be stopped at once, and nourishment given in small amounts, carefully prepared, and frequently administered. It is to be remembered, however, that above all things the physician must use his judgment, and if he finds that sufficient strength yet remains to his patient for the second attack to partake of a dynamic or sthenic character similar to that of the first he must use bleeding, leeching, cupping, or cardiac sedatives.

If the consolidation be very widespread in any case the entire heart becomes strained by the venous congestion and arterial tension, due to partial asphyxia, while there is also danger of death from lack of oxidizing space for the blood. No better treatment exists under these circumstances than the inhalation of oxygen, either almost pure or mixed with air. By this means even a small patch of lung offers sufficient oxygen to the blood to cause its complete oxidation. This gas may be obtained in small cylinders, which, by compression of the gas, will hold forty gallons, at several large establishments, notably at the offices of the S. S. White Dental Company, which has agencies in all the large cities of the United States, or it may be made by the physician himself in the following manner: Take 4 ounces of chlorate of potassium, which must not contain a single chip or piece of organic matter, and add to it an equal quantity of peroxide of manganese. These should be placed in a retort or strong flask, and an alcohol lamp placed under it. The gas, as it is generated, escapes through a tube, which should pass into a large jar of water so that the gas, as it bubbles up, may become cooled and purified; a second tube may now lead the gas to an inhaler over the patient's mouth. It should be remembered, however, that chlorate of potassium may explode if contaminated by the smallest piece of organic matter.

The period in the treatment of pneumonia when simple poultices do the greatest service, and the only time when they are to be employed for valid reasons, is during the second and third stages of the disease, when clinical experience shows that they are of value in aiding in the production of resolution and in loosening the cough. How they act, except by increasing the warmth and moisture of the parts, we do not know, unless by the production of some reflex influence excited upon the lungs from the skin by means of the nerves. Unless the attendant is unusually intelligent and well trained, the common poultice does more harm than good, because it is allowed to get cold, or the patient is chilled when it is changed. The proper application is the cotton and oiled-silk jacket, particularly in young and restless children.

The remarks which have just been made deal entirely with simple poultices, and not with those possessing other agents in their mass, such as those agents belonging to the counter-irritant group of drugs. By far the most commonly used substance under these circumstances is mustard, and its addition to the mass at once allows this method of treatment to be employed in the first as well as in the later stages.

PRURITUS.

Itching of the skin or mucous membranes about the openings of the body is a very common state, and while it may be dependent upon local causes, such as lice or fleas, it more commonly depends upon some systemic state, as debility, diabetes, albuminuria, or other similar causes. The treatment, therefore, consists, first, in the removal of the cause, and, next, in the local treatment of the condition. There is generally no redness, except from scratching.

Internally, arsenic, quinine, bitter tonics, cod-liver oil, alkaline diuretics, or mineral waters, are useful in debilitated cases, and an avoidance of condiments, such as mustard or pepper, is needful if the disease affects the mouth of the urethra or vagina.

The local treatment of pruritus consists in the use of lotions, salves, or ointments made up of various constituents, a number of which are capable of acting as local anæsthetics. Very often bathing the the parts with 1 drachm of bicarbonate of sodium or of borax to a pint of cold water gives relief temporarily, and the following formula will be of service:

℞.—Acid. carbolic. . . . . . . fʒj to fʒij.
Aq. dest. . . . . . . q. s. Oj.
M.—S. Apply as a lotion several times a day.

Or,

℞.—Liquor carbonis detergens[1] . . . . . fʒij.
Aquæ . . . . q. s. Oj.
M.—S. Apply as a lotion.

or an ointment made up as follows is serviceable:

℞.—Acid. carbolic. . . . . . . gtt. v to xx.
Adeps benzoinatis . . . . . . ℥j.
Ung. petrolei . . . . ℥j.
M.—S. Apply as an ointment.

In other cases, 10 to 20 minims of chloroform may be used in place of the carbolic acid.

Cocaine may be painted over the parts, but it should rarely be used in ointment, as fats prevent its acting effectively. It should also be remembered that the anal and vaginal mucous membranes are so thick that strong solutions are necessary to produce anæsthesia and that the effects of cocaine are only temporary. Where the itching is very obstinate the parts may be painted with a solution of nitrate of silver of the strength of 20 grains to the ounce of water, cocaine having been previously applied to relieve the pain of the application.

PUERPERAL DISEASES.

The diseases of the puerperium may be divided into two broad classes—infectious and non-infectious. The first class should be further sub-divided into (1) those infectious diseases in which the point of infection has been somewhere along the parturient tract, and (2) those in which the infecting poison has entered the body by some other channel. Under sub-heading 1 come all those diseased conditions, grouped together in the very inadequate generic terms "puerperal fever," "puerperal septicæmia," "puerperal infection," and the like, none of which truly expresses the condition. If it is necessary in medical nomenclature to have a single term which shall denote infection of the genitalia after delivery, a word should be coined strictly limited in sense to mean the pathological conditions which result from the activity of pathogenic microbes along the whole genital tract. This classification is necessary for a clear and systematic description of the treatment of diseases in the puerperal state.

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[1] For method of preparing this liquor, see page 407.

The treatment of infection along the genital tract after labor. By far the most common form of infection along the genital tract after labor, is the absorption of ptomaïnes from the infection and decomposition of membranes, fragments of placenta or blood within the uterus. This condition will be found in more than 75 per cent. of all cases in which infection occurs at all. Therefore, in any case, after labor, in which there is fever that can not be explained by some evident cause independent of the genitalia, it is safe to assume ptomaïne poisoning and to act accordingly. The indications are plain: to destroy the microbes and thus at once stop the manufacture of their poisonous products, and, if necessary, to remove their habitat.

The writer's routine application of this principle in practice is as follows: If the temperature, after delivery remains over 100°, for twenty-four hours without evident cause, independent of the genitalia, he washes out the uterine cavity with at least 1 quart either of bichloride of mercury solution, or a 2 per cent. solution of 1:2000 creolin. The former is more convenient in private practice because the tablets of corrosive sublimate can be easily carried about in one's instrument bag. To insure the entrance of the antiseptic fluid to the fundus and its free exit from the cervical canal, an intra-uterine catheter is desirable. Of all those upon the market, the best is that manufactured by Lentz, an instrument maker of Philadelphia. If, however, the cervical canal is patulous, as it usually is after labor, a hard rubber catheter attached to a Davidson's or fountain syringe, answers the purpose perfectly.

In the majority of cases this treatment will bring the temperature down to normal within twenty-four hours. If fever does not disappear within this time, or even perhaps rises higher, the second indication must be met. The infected albuminous substance within the uterine cavity must be removed in order to deprive the microörganisms of their feeding-ground. This is best accomplished by the use of the curette and the placental forceps, care being taken in the employment of the former instrument to guard the uterine wall itself from the slightest injury, for not only can the uterine muscle be perforated by a curette in clumsy hands, but slight wounds of the uterine substance with this instrument may be enough to inoculate the general system with the germs whose activity had been confined before to the uterine cavity.

The writer's manner of employing this plan of treatment after labor is as follows:

The anterior lip of the cervix is seized with a double tenaculum and pulled gently downward; a cleansing uterine douche is then given in order to disinfect the field of operation; next the curette is inserted to the fundus, and the whole interior of the uterus is carefully gone over with the instrument. First the fundus and then each of the four sides; then the curette is turned with the scraping surface upward and withdrawn from the cervical canal, a finger in the vagina meeting its tip as it emerges in order to help extract any substance which may be caught by and entangled in it.

Next the placental forceps is inserted and an effort made to grasp any material lying loose within the cavity or still attached to the uterine walls. It is usually best to repeat each of these manœuvres several times until nothing more can be brought away except a little clear blood.

Then the uterine cavity is again thoroughly washed out. The writer has many temperature charts in his possession which show the success of this treatment, when simple uterine irrigation has failed. Occasionally it is necessary to repeat the irrigation, and even the curettement, for several successive days. If, as rarely happens, this treatment should prove unsuccessful and the temperature should remain elevated in spite of irrigation and the use of the curette and placental forceps, one must assume either that general systemic infection has occurred, or, at least, that an inflammatory action has begun in the uterine walls or within the tract of the tubes. One of the earliest, surest signs of systemic invasion is the appearance of peritonitis.

In such a case the only available treatment is to support the body-cells in the combat which they must wage with the invading micro-organisms. This is best accomplished by the administration of as large a quantity of nutriment as the patient can stand without rebellion of the stomach or bowels, and the exhibition of a large quantity of alcoholic stimulant. Cases of this sort not infrequently require more than a pint of whiskey or brandy in the twenty-four hours. Occasionally measures will be required to reduce an exaggerated elevation of the temperature, but this is best abstained from as long as possible, for antipyretic treatment is usually depressing and ill-suited to the patient's adynamic condition.

With this plan of treatment, about three-quarters of the cases of general septic infection, after labor will recover. There may be some in which metastasis occurs so early to important organs as to render all treatment of no avail. There will be others in which the peritoneum is early infected, and in which the septic peritonitis develops rapidly and to an extensive degree. It is in such cases that laparotomy and evacuation of the septic matter, usually pus, within the peritoneum will occasionally save life. The physician must guard himself, however, from the disposition which is prevalent at this day, to operate too early and unnecessarily. After operation, drainage of the peritoneal cavity is an essential feature of the treatment, even although the evidence of suppuration within the cavity is slight. The writer has in mind a case in which an operation was performed ten days post-partum, for septic peritonitis; a very small quantity of purulent lymph was found upon one ovary, which was greatly enlarged and contained a small quantity of sero-pus. The ovary was removed and the abdomen closed without drainage, as there was no other evidence of suppuration within it. Thirty-six hours later the patient died and the peritoneal cavity was found filled with pus which had accumulated in that short space of time. In the early stages of the peritoneal infection, if the subject is vigorous, not exhausted by a prolonged labor or other depressing causes, the administration of saline purgatives in concentrated solution will often effect brilliant results.

The writer's system is to give a dessertspoonful of the concentrated solution of Epsom salts every fifteen minutes until free evacuation of the bowels is secured. He has seen the temperature reduced by this plan of treatment from 104° to normal, in the course of twelve hours, and with the reduction of temperature all the symptoms of peritonitis, which were well marked, entirely disappeared. In the treatment of microbic activity along the parturient tract, after labor, it should never be forgotten that the point by which the microbes invade the system, may be anywhere from the fundus of the uterus to the parturient outlet, therefore the practitioner should never neglect to examine carefully all the lower parturient tract, in order to detect, if possible an ulcerated surface covered by diphtheritic membrane, which if overlooked might be the entrance-point for a fatal infection. These unhealthy surfaces are best detected by the use of a cylindrical speculum of clouded glass introduced so that the cervix appears within its inner end and then withdrawn, so that the vaginal mucous membrane as it prolapses into the end of the speculum may be examined, and treated if necessary throughout its whole extent. If an unhealthy, ulcerated wound is thus discovered, the writer's practice is to apply to it a solution of nitrate of silver 40 or 60 grains to the ounce. In the vast majority of cases this application will promote an exfoliation of the unhealthy membrane, and the appearance of healthy granulation tissue within a few days.

It may, in some cases, be necessary to employ a stronger application, as the solution of chloride of zinc, but the writer has not been driven to its use. The most common point of infection outside the parturient tract after labor is some portion of the urinary apparatus, almost invariably the bladder. The process of parturition necessarily diminishes the vitality of the vesical mucous membrane cells by the pressure and stretching to which they are subjected. After labor, therefore, they are not in a condition to resist the attacks of microorganisms, should these in any way gain access to the vesical cavity. Most commonly microbes are introduced into the bladder by a catheter. This, however, is not necessary, as it has been plainly demonstrated that they can wander from the vaginal canal through the urethra into the bladder without the intervention of an instrument which directly carries them into the vesical cavity and deposits them in that situation. Once arrived within the bladder the microbes attack the depressed bladder cells, and very often gain a lodgement in the vesical mucous membrane. This is manifested by the usual symptoms of septic cystitis, fever, pus in the urine, pain on pressure over the hypogastrium, and pain and difficulty in micturition. The duration of these symptoms is, as a rule, not very long. The fever subsides, and the symptoms of cystitis disappear. After an interval of some days, however, there is again a sharp outbreak of fever, with pain in the region of the kidneys, and the re-appearance of pus, or at least of numerous microbes in the urine. This indicates a septic infection of the pelves of the kidneys after the microörganisms have migrated along the ureters. During their course their presence has not been manifested by any symptoms. In the majority of cases even the symptoms of pyelitis will disappear after a time, and the patient will make a good recovery; but in a certain proportion there is a systemic infection by the direct passage of microbes or their products from the kidneys into the blood. There may be an extensive suppuration of the kidneys and surrounding tissues, with fatal result, or, as the writer has seen in several cases, the symptoms of general systemic infection become so grave as for a long time to threaten the patient's life. In the worst cases of bladder infection the mucous lining sloughs, peritonitis develops, and the patient dies before the disease has time to spread to the kidneys.

The practitioner, bearing in mind the serious consequences of septic cystitis after labor, should always be on the watch for it, and should adopt, immediately upon its discovery, an energetic treatment. A thorough disinfection of the bladder will remove all present symptoms, and prevent the occurrence of grave and possibly fatal after-complications. To accomplish this purpose the writer employs one-half of one per cent. solution of creolin. One injection of a quart of this solution through a two-way catheter is usually sufficient. Occasionally it is necessary to repeat it, or to follow it by several injections of boric-acid solution. In susceptible individuals creolin causes too much pain to be employed. A 1 to 8000 bichloride of mercury solution may be substituted for it, or, in mild cases, a solution of boric acid alone will be sufficient.

If, in spite of all precautions, infection of the kidneys should ensue, a vigorously, stimulating and supporting plan of treatment affords the only hope of success. If extensive suppuration occurs in the kidneys, all treatment will, of course, be useless.

Perhaps the most uncommon point of septic infection after labor is the rectum. The writer has, however, seen one fatal case of this sort from the use, no doubt, of a dirty syringe nozzle in the hands of a careless nurse. It would be difficult, or perhaps impossible, to diagnose such a case until after death, and, therefore, treatment directed toward this form of infection will usually not be adopted.

Next in frequency to the parturient tract and the urinary system as a region of infection after labor come the breasts. Infection of the nipples, and a consequent mammary inflammation, or suppuration, is one of the most troublesome minor complications that the obstetrician is called upon to treat. By careful preparation of the nipple during the last month of pregnancy, and by extreme care to secure perfect cleanliness during the period of lactation, infection of the breasts can almost surely be avoided. If it occurs, the first effort should be to limit its extent and degree, and to prevent, if possible, suppuration. The best means to accomplish this end are derivation of the blood from the mammary glands by an active purge, compression of the gland-substance, and support of the breasts by a suitable mammary binder.

To these should be added, in the acute stage of inflammation, fomentations of very hot water, and later, the application of cloths wrung out in lead water and laudanum, renewed every three hours. Unless the infection has been of a virulent nature, and the dose of infective material large, this plan of treatment will almost surely dissipate the inflammation and prevent suppuration.

The other infectious fevers of the puerperal state include the infectious diseases which can, under any circumstances, fasten themselves upon the adult female, and their treatment differs in no respect during the puerperium, unless there should be developed some local complications.

Non-infectious Diseases of the Puerperium.

Anomalies of Involution.—Super-involution, an exaggeration of that process by which the uterus is reduced to its normal size after labor, only manifests itself, as a rule, after the puerperal state is completed, and, therefore, its treatment need not be further considered.

Subinvolution, an arrested or retarded return of the uterus to its normal condition, and dimensions after labor, is one of the commonest complications with which the obstetrician has to deal in the management of the puerperium. The cause of subinvolution is always a local one. General conditions, as acute fevers and so on, have no influence whatever upon the process of involution, unless they are accompanied by some local complication.

There are two causes which prevent the involution of the uterus which must be borne in mind when one is called upon to treat this condition. The involution may be prevented on the one hand by anything which calls an excessive amount of blood to the uterine body, as, for instance, small fibroids within its wall, or hypertrophied deciduous membrane remaining adherent to its inner surface. On the other hand, subinvolution may be the result of mechanical obstruction to the contraction of the uterine walls and the reduction of its cavity to the normal size. As an example of this we have a retained placenta or a submucous fibroid or adhesions, dragging the uterus out of place and preventing its contraction, or most commonly, perhaps, an over-distended bladder and rectum.

In those conditions which result in a hyperæmia of the uterus the cause of an excessive blood supply must be sought out and removed before one can remedy the subinvolution.

If small fibroids can be detected the administration of quinine, ergot, and strychnine, in pill form, has been found most useful. If practicable, a faradic current may be employed in addition to medication. If there is a hypertrophied endometrium retained within the uterus a curette will most quickly and effectually hasten involution. In cases of heart disease, in which the blood current is sluggish and dammed back into the large veins of the trunk, digitalis will be the most effective remedy to overcome the subinvolution. There may be an active hyperæmia associated with inflammatory action, either in the uterine wall or upon its peritoneal covering, or in its annexa; in this case the inflammation must be overcome by disinfection, the use of purgatives, and, possibly, the local application of hot water, before involution can be secured. When there is mechanical obstruction to the return of the womb to its normal dimensions the hindrance must, of course, be removed before one can expect a good result from treatment. In the case of retained adherent placenta every effort must be made to remove the placental tissue. In the case of submucous fibroids their removal must be attempted if there is any hope of safely accomplishing it.

There is no case of labor which does not leave behind, in the parturient tract, some injury to the maternal structures. Usually, these are slight in degree, manifesting no symptoms, and healing spontaneously. Occasionally, the injury done results in fistula, communicating with the bladder or rectum, in deep granulating wounds in the vagina, or in ulcerated sores.

In the case of fistula a cure can sometimes be effected without operative interference by touching up the edges of the fistulous tract with nitric acid in order to excite an outpouring of granulation tissue in the hope that it may plug up the opening. In deep tears, which have not been primarily united, application of a solution of nitrate of silver will hasten the cure and prevent infection of the wounded surface. If ulceration occurs the ulcerated spots are to be carefully watched and treated in the same manner.

Hæmorrhages from the birth-canal after labor depend upon a number of well-known causes, which must be sought out and corrected before the bleeding will cease. Most frequently, the cause of a hæmorrhage will be found in retained fragments *in utero*, which must be removed. Not infrequently displacements of the uterus will be found as a cause, and correction of the displacement will stop the bleeding.

In interstitial bleeding, after labor, resulting in hæmatoma, care must be taken to preserve the parts in as aseptic a condition as possible, while an attempt is made to limit the bleeding by the application of direct cold, preferably by means of a Barnes' bag dilated with ice-water, which must be removed from time to time in order to allow the lochia to escape. After rupture or incision of these blood tumors the cavity left behind must be carefully disinfected with the bichloride of mercury solution or creolin, and, if necessary to control further bleeding, well packed with iodoform gauze.

Of all forms of bleeding that which occurs directly after labor, in consequence of inertia uteri, known as post-partum hæmorrhage, is the most frequent of occurrence, and the most alarming and dangerous in its manifestations and consequences. No one should attend a case of obstetrics without having in mind a clearly-defined programme to be put in immediate execution when called upon to deal with this frequent and dangerous complication. There are two indications to be met. First, to control the hæmorrhage, and, second, to treat the after-condition. The first indication is met by the following plan of treatment: External stimulation of the uterus by kneading and rubbing through the abdominal walls, as is practised in Credé's method of expressing the placenta.

Next carry the other hand into the uterus and remove any blood-clots, pieces of placenta or membrane that may be found there, while the internal surface of the uterine walls is irritated by the manipulations of the operator's fingers.

Next apply a small piece of ice upon the abdomen externally and carry another piece the size of a hen's egg into the uterine cavity. The use of cold must not be persisted in for more than a minute at most, for its ultimate action is depressing and relaxing.

Next soak a clean linen handkerchief in vinegar, carry it up to the fundus and squeeze it out so that the vinegar shall run down over the uterine surface.

Next, hot water at a temperature of 116° or 120° should be injected into the uterine cavity.

Then if one happens to have the necessary appliances at hand (a small Gaiffe battery, which can be carried in an ordinary instrument-bag), a strong faradic current can be applied to the uterine muscle.

Finally, as a last resort, the uterine cavity may be packed with long strips of iodoform gauze in the manner suggested by Dührssen and carried out by a number of observers with gratifying success.

Drugs, as the styptic salts of iron, and especially Monsel's solution, have been recommended from time to time as intra-uterine applications in the case of post-partum hæmorrhage, but they are dangerous, for the coagulation produced by them may extend far into the uterine vessels, and the clots must be broken up by putrefaction, exposing the patient to the danger of septic poisoning. This programme is to be carried out in the order given; if the milder measures suffice of course the more radical plans of treatment will not be employed. Excessive hæmorrhage (post-partum) from lacerations along the genital canal can be controlled by well-placed sutures.

Bearing in mind this plan of treatment it is almost inconceivable that an intelligent and skilful practitioner should lose a case of post-partum hæmorrhage.

The physician should give ergot in full dose by the mouth, and, if need be, hypodermically. (See page 151.)

Treatment of the After-condition.—While the physician is busy controlling the hæmorrhage, the nurse should administer a hypodermic of ether, if symptoms of shock or collapse are manifested. After the bleeding has ceased it is well to administer an enema of a pint of hot water, which brings up the patient's temperature, relieves the shock and by its irritation promotes contraction of the uterine muscle. This should be succeeded by small doses of hot, strong brandy-and-water, and a little warm milk if the stomach will retain it. As soon as reaction is well established a half-pint of hot beef-tea should be administered and a hypodermic of $\frac{1}{8}$ grain of morphine given in order to secure quiet and rest and to get the stimulant qualities which this drug undoubtedly possesses. Occasionally measures must be adopted to retain enough blood within the large vessels and in the heart to prevent excessive cerebral anæmia or cardiac failure. This is best done by auto-transfusion; that is, by bandaging the extremities toward the trunk in order to secure as large a quantity as possible of blood within the vessels of the trunk and brain. Actual transfusion of a $\frac{6}{10}$ of 1 per cent. solution of common salt into the bloodvessels is required when there is profound exhaustion and depression after hæmorrhage. It has been demonstrated that it is not necessary to throw this solution directly into the bloodvessels, as interstitial injections seem to answer the purpose equally well.

The milk secretion during the puerperal state presents abnormalities which call for treatment. One may have to deal with anomalies of quantity or quality. The most frequent anomaly of quantity in milk secretion is unfortunately one of defect. Insufficient milk supply depends on a number of causes Perhaps the most frequent is a lack of development in the glandular tissue, and in this form of insufficient milk secretion no treatment can be of avail. Where the lack of milk is due to some intercurrent affection in the puerperal state the treatment must be directed toward this complication before the milk supply can be re-established in normal quantity. It may be the consequence of hæmorrhages or of diarrhœa. It may be the result of an acute febrile attack during lactation or of inflammation within the gland itself. Serious organic disease may also be a cause, and insufficient nourishment must be held accountable in some cases. Profound emotions exert an extraordinary influence upon lactation in altering both the quantity and the quality of the milk. It has long been supposed that the return of menstruation has a disastrous influence upon milk secretion. This, however, has been definitely disproven by careful observations recently conducted in Austria. The simple return of menstruation without complications has no apparent influence as a rule upon the quantity or quality of the woman's milk. In all the temporary diseases interfering with milk secretion described above, it should be borne in mind that on the disappearance of the abnormal general or local condition, milk secretion can be successfully re-established, even though it be intermitted for days or weeks. Electricity has been much vaunted of late as a remedy for insufficient lactation. It may be applicable in cases of torpidity of the mammary gland, or in those cases where lactation has been suppressed on the birth of a first child, and where the mammary gland therefore does not respond readily to the stimulus of subsequent births. This remedy will, however, often prove ineffective and disappointing. Quantitative anomalies in milk secretion by excess are not frequently met with. In the milder and simpler forms they can be managed by regulation of the diet and free purgation. Galactorrhœa, a constant flow of milk from the breasts, is one of the most stubborn forms of excessive milk secretion. Two measures can usually be relied on to give relief: firm compression of the mammary gland with the application of belladonna ointment, and the administration internally of iodide of potassium. In some cases of this sort milk secretion stops spontaneously with the return of menstruation, and in a certain proportion of cases a treatment to secure a discharge of blood from the uterus has been successful in stopping the flow of milk. Success has been obtained with Simpson's plan of introducing a piece of caustic within the uterus in order to bring back the menstrual flow. Warm douches have been used successfully for this purpose. Electricity has been recommended to secure the proper contraction of the sphincter muscles of the lactiferous ducts, but as this is usually a result and not a cause of the galactorrhœa, the use of electricity must prove in the vast majority of cases ineffective. The long-continued administration of ergot has been warmly recommended. The remedy should be tried, for its use seems rational. It has been demonstrated that all those drugs which bring about an increased arterial pressure in the parts promote milk secretion, while those which lower arterial pressure tend to diminish or even abolish the function. Chloral has been shown to be very effective in diminishing the quantity of milk. Therefore this drug is worthy of trial. It has recently been declared that antipyrine in 2½ grain doses three times a day will diminish milk secretion. The drug, however, has not been often enough tested to demonstrate its power. Quantitative anomalies in the milk secretion must often depend upon an ill-regulated diet. A fatty diet will diminish the quantity of milk ; a vegetable diet will diminish the caseine, and fat will increase the sugar; a diet rich in meat, especially if reinforced with alcoholic stimulants, will increase the fat and caseine, but will diminish the sugar. If the mother's milk is evidently disagreeing with the nursing infant, a chemical analysis of it should be made and on the result rules regulating the diet should be adopted. The most common mistake in practice is to over-feed a nursing woman, especially with a milk diet, with the idea which prevails extensively among the laity that the cow's milk poured into the stomach appears again in the mammary gland. It is usually sufficient for a nursing woman to observe the ordinary diet which agrees with her under all circumstances, with the addition perhaps of a half-pint of milk midway between the morning and mid-day and mid-day and evening meals. Occasionally a wineglassful of malt at the mid-day and evening meals is a useful addition to the diet, and in anæmic patients the addition to the malt of 5 grains of pyrophosphate of iron will be an advantage.

There is found in every pregnant woman some alteration in the constitution of the blood, which consists, roughly speaking, of a diminution of the red blood-corpuscles, and albumin and the iron in the blood, with an increase in the white blood-corpuscles and the watery element. In some cases this change is much exaggerated, until an intense degree of anæmia appears in the puerperal state which, in its severity, will simulate pernicious anæmia, or some fatal form of blood-disease. The anæmia of puerperal women, however, even in exaggerated cases, usually yields to treatment in a most gratifying manner. After the prolonged use of Blaud's pills, the writer has seen the blood corpuscles rise from less than three to nearly four and a half millions, and the hæmoglobin increase from 40 to 75 per cent. in a few weeks. In some cases arsenic alone succeeds where iron fails completely.

Eclampsia.

To treat eclampsia intelligently and successfully it is necessary to understand its etiology as fully as modern knowledge permits. Although the subject needs more light from future investigation, enough is now known to justify the following statement :

1. The cell activity of mother and fœtus produces excrementitious substances which will surely prove virulently poisonous to the whole organism unless they are voided or made harmless by the excretory organs.[1]

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[1] Harold C. Ernst: American System of Obstetrics, vol. ii. p. 451.

2. These organs in the childbearing woman are often inadequate to the disposal of effete material from the maternal and fœtal body.

3. Consequently, poisons, of a nature not yet demonstrated, are stored up in the maternal blood until, by cumulative action, their presence is manifested in the eclamptic seizure and other symptoms.

4. The convulsions are probably the result of an acute cerebral anæmia brought about by violent contraction of the arterioles; possibly by direct irritation of the brain substance. As a result of intense muscular action the circulation is interfered with and blood is determined to non-muscular regions, as the brain, lungs, kidneys, etc., to such a degree that the congestion of these parts becomes dangerous, leading to apoplexy in the brain, œdema in the lungs, and often a complete abrogation of renal function.

The indications for treatment in convulsive seizures of this nature are plain:

First, to attack the *fons et origo mali,* to eliminate the poisons from the blood as quickly and in as large quantities as possible. Second, to diminish nervous sensibility and lessen muscular power, in order to reduce the convulsions in vehemence, duration, and frequency. Third, if convulsions occur during labor, to save the infant without adding to the risk of the mother. Fourth, to guard the woman from injury during the attack.

The first indication is met by venesection, diaphoresis and catharsis. By the first, one eliminates a certain quantity of poison along with the blood and relaxes the muscles. If there is sharp post-partum hæmorrhage, or if the patient is from any cause weak and anæmic, bloodletting is not called for. In the ordinary case, however, with full pulse, congested head, the veins standing out upon the neck and face, venesection is an undoubted advantage. It is not of itself enough. While the median basilic of one or both arms is being opened, some croton oil should be sent for; 2 drops may be placed upon the tongue. Directions should at the same time be given to wring out three or, better, four old blankets in boiling water; these are to be wrapped around the legs, trunk and arms, and well covered over with one or more dry blankets. The sweating thus induced is profuse. An ice-bag must be put to the head to prevent over-congestion of the brain. In this way one eliminates the cause of eclamptic convulsions as quickly and thoroughly as possible from the blood, directly and indirectly through the skin and bowels. The latter may be acted upon by $\frac{1}{4}$ grain elaterium rubbed up in butter, or by compound jalap powder and calomel, instead of resorting to the croton oil. Pilocarpine seemed at one time an ideal remedy to secure diaphoresis in eclamptic cases, but it has lately fallen into well-deserved disrepute. It much increases the danger of pulmonary œdema and is too profound a depressant. It is no longer employed by experienced and educated obstetricians. The second indication is best met by an anæsthetic. Usually the convulsion first shows its approach in the eyes; these should be closely watched, so that on the first symptom of the oncoming attack chloroform may be at once administered and pushed as rapidly as possible. Ether is inadmissible in these cases, for it is slow of action, congests the brain, and irritates the kidneys. Just before the woman is wrapped in blankets, 1 drachm each of chloral and bromide of potassium in solution should be injected into the rectum. This may be repeated in an hour if necessary. Morphine, veratrum viride, and inhalations of nitrite of amyl, have their enthusiastic advocates in this connection. They may be held in reserve, in case the plan of treatment described needs reinforcement.

If convulsions come on during labor, the child should be rapidly extracted as soon as the os is well dilated. Not before, because efforts to dilate the os would be very apt to increase the convulsions, and would attract the physician's attention from the woman's most threatening danger. Moreover the os dilates naturally with unusual rapidity during eclampsia.

The only injury to be feared during eclamptic attacks is wounds of the tongue from the teeth. This can be prevented by inserting between the teeth a brush-handle wrapped in a handkerchief, or by drawing a towel into the mouth like a bit. Well-meaning but ignorant bystanders will sometimes throw themselves upon an eclamptic patient to restrain her convulsions by force. This should be forbidden.

REMITTENT FEVER.

This is sometimes called bilious fever, by reason of the violent bilious vomiting and jaundice often accompanying it. It separates itself from intermittent fever by the fact that the patient's condition, chiefly as regards temperature, does not have normal intervals, but has periods of only temporary improvement, or, in other words, the disease remits.

For the proper treatment of this fever, three things must be borne in mind: 1. It is more dangerous than intermittent fever. 2. It is dangerous in the hot stage, not in the cold stage. 3. The patient, not having periods for complete or partial recovery, rapidly loses strength. The safety of the patient here depends upon the use of large doses of quinine to cut short the pyrexial stage, the doses used being from 20 to 30 grains, preceded by a good-sized purgative dose of calomel, say 3 or 4 grains. If vomiting is too violent to permit of the retention of the quinine, it must be used by the rectum and hypodermically, and the stomach and intestines be swept out by the use of divided doses of Seidlitz powder (see Seidlitz Powder, page 267). If purgatives are used, they should precede the quinine by twenty minutes, as otherwise the latter drug is swept out into the bowels, where it is useless by reason of its precipitation by the alkaline juices there present. If pyrexia is excessive, relief must be sought in the cold pack and antipyrine.

The best treatment of the vomiting is the use of small doses of morphine, or 3 to 5 drop doses of the spirit of chloroform in 30 drops or 1 drachm of cherry-laurel water. Aconite may also be used if the patient is strong enough. (See Vomiting.)

If the belly is tender, a turpentine stupe should be applied. (See Turpentine, page 288.)

If intestinal hæmorrhages occur, gallic and tannic acids or Monsel's salt, in the dose of 3 grains in hard pills may be used, and cold cloths be placed over the belly. (See Hæmorrhage.)

The treatment of convalescence consists in the use of tonics, such as quassia, columba, gentian, Huxham's tincture, arsenic, and purgatives when needed, with attention to the kidneys, chiefly employing the potassium salts to keep them active.

RHEUMATISM, ACUTE ARTICULAR.

No better example of the fact that therapeutics is in advance of pathology can be adduced than the disease known as rheumatism. The therapeutist cannot tell how he cures the condition designated by this name, simply because the pathologist cannot tell what the cause of the disease is, and when this information is forthcoming from the one side an explanation will be immediately given by the other. This being the case, we must devote ourselves to the study of pure empiricism, and not to logical pharmacology.

The treatment of acute articular rheumatism is divided into that devoted to the cure of the diseased process, and that directed to the relief of the pain and of the local manifestations of the disease.

When an acute attack of rheumatism comes on, it is nearly always accompanied by a high temperature, a bounding pulse, and all the evidences of an active systemic disturbance following upon inflammatory outbreaks, which, in this particular instance involve the joints. We may, therefore, use at such times the remedies which we have learned are best able to combat inflammation, namely, aconite and veratrum viride. So powerful are these drugs in the early stages of acute rheumatism that some persons have believed them to be possessed of a specific anti-rheumatic power. This is, however, highly unlikely, as they act no better here than in other inflammatory conditions elsewhere.

The proper manner in which to use the tincture of aconite under these circumstances, in a strong healthy individual, is to administer 3 drops at once in a little water and follow it by a teaspoonful of a mixture containing 5 drops of tincture of aconite and 2 ounces of water, every half hour until perspiration on the skin betokens circulatory depression through the action of the drug. If this is not done veratrum viride in the same proportions may be used. The advantages of this treatment are numerous: first, it allays the fever; second, it quiets nervous excitability; third, prevents permanent changes in the joints involved; and, last of all, aids in the production of a sweat. Whenever these drugs are employed the patient must be strong and hearty, not debilitated or weak, and it is to be noted that this treatment is not to be resorted to carelessly, and, finally, care is to be taken that the symptoms of depression from the drug and the disease combined do not become too severe. Where great exhaustion is primarily present, or ensues upon the use of depressant drugs, alcoholic stimulants are particularly needed.

Along with these internal measures a solution of bicarbonate of sodium, 20 grains to the ounce, may be applied by means of lint wet with this solution to the joints involved, with relief to the sense of heat and burning, or, in other instances, ice-cold compresses may be tried.

Immediately after the system has been thoroughly impressed by cardiac sedatives, or at once, and in their place, if the case is not seen at first, or is weak, the physician should resort to one of three remedies, namely, salicylic acid or its salts, antipyrin, or acetanilide. The general opinion of the profession seems to be that these three remedies stand in the order here placed in regard to their efficiency, but it is also true that one will often succeed when the other fails, and it is worthy of note that success or failure generally asserts itself rapidly—that is, the drug used gives relief in twenty-four or forty-eight hours, or fails. It is most important to remember that salicylic acid seems to protect the cardiac valves and the endocardium from the ravages of the disease more than do the other two newer remedies.

Taking up salicylic acid first we find that its proper use is often misunderstood, and that it fails because of this fact. Whenever acute articular rheumatism appears the salicylic acid should be pushed in the same way that we use quinine in full dose on the advent of a malarial paroxysm.

It is useless to give the drug in 5 or 10 grain doses three times a day; it must be given in 20 grain doses morning, noon, and night, or not at all. If all the sweats are too severe, or the stomach rebels, the drug may be stopped, but not decreased in amount, unless for good reason. Further than this, if salicylic acid is used for two or three days in this way, and produces evidences of cinchonism, yet fails to alter materially the course or severity of the trouble, it should be withdrawn, as it will rarely, if ever, do any good after this time.

Antipyrine and antifebrin may both be considered together since their action is identical in rheumatism. The author believes that antipyrine, while often relieving the pain more than the antifebrin, nevertheless does not act so favorably in decreasing the duration of the disease. The dose of the first should be 10 to 20 grains three times a day; of the second, 4 to 8 grains at the same intervals.

The studies of Guttmann with antifebrin in a very large number of cases of rheumatism, embracing all its forms, both chronic and acute, have given most encouraging results, and we have seen the drug act most happily in several cases which had refused to yield to the iodides and salicylates, and all of these cases were of the severe acute form, suffering intense pain from the articular inflammation, but devoid of any cardiac complications. It at once becomes evident that a drug such as antipyrine or antifebrin may do good in a case of rheumatism in three entirely separate and distinct ways, any one of which may be active at once or all active together, hand-in-hand in the improvement of the patient's state. Any substance possessing strong antipyretic power must be of value under such circumstances, because of the lowering of the fever which follows its administration, with the resulting quieting of an excited system, and in putting aside the delirium associated with a condition of hyperpyrexia. Not only does such a drug act favorably in this manner, but the analgesic effects of such a substance must exert a powerful influence for good. By benumbing the sensibility of the patient to the excruciating pain consequent upon movement, and so putting aside the nervous wear and tear of sleeplessness and suffering the patient's state must improve, or, at least, not grow worse from the exhaustion of the long hours of agony. Further than this it would seem probable that antifebrin possesses a direct anti-rheumatic influence, allaying the diseased processes even in those forms where, pain being largely absent, the improvement must be real and not apparent, as a result of the relief of pain and gain in sleep.

The intention of the author is not to extol the value of antifebrin and antipyrine in rheumatism to the exclusion of other means of relief, nor to recommend its use before the more thoroughly tried salicylates and iodides, but to draw to its standard a certain number of cases which persistently resist treatment of the ordinary stamp and which put the physician to his wit's end for a change of treatment, at least promising some chance of relief. Many of the readers of this book have doubtless seen such cases, and many of them must have learnt by sad experience that acute articular rheumatism is in many cases bound to run a course of so many weeks or days, do what we will. Under these circumstances nothing acts further than a palliative, and the patient and his friends become impatient for a change. We have found that antifebrin in such cases will often relieve the pain and so permit a refreshing sleep, in doses of from 4 to 8 grains three times a day, and that these amounts do not cause the excessive sweating which the necessarily large doses of salicylate are sure to produce, sweats which leave the patient oftentimes almost dyspnœic from very weakness. Whether this temporary relief produces such changes in the system as to permit of a better battle against the disease, or whether it actually counteracts the rheumatic poison, we know not; but we do know that following its employment the relief is not only temporary, but often permanent, and that a very distinct step in advance is made toward the close of the attack if any influence at all is felt.

A very efficient substitute for salicylic acid is the oil of gaultheria (wintergreen) which contains about 90 per cent. of the salicylate of methyl. The dose should be 10 to 20 drops on a teaspoonful of sugar or in capsule or emulsion three times a day, after meals.

Passing from what may be appropriately called the coal-tar treatment of rheumatism, because all the drugs so far named for internal use have had such a source, we come to a line of remedies heretofore largely used in rheumatism in place of the newer compounds, but which are not so commonly employed to-day.

These remedies act, as a rule, in the subacute forms of rheumatism or in the cases where the first group fail because the disease is obstinate. Of these the chief is the iodide of potassium followed by the acetate, bicarbonate and citrate of potassium. If the iodide is used the following prescription is of service:

℞.—Potas. iodid.	℥j.
Syr. sarsaparillæ comp.	℥vj.

M.—S. Dessertspoonful t. d. after meals.

Or, if preferred, 20 to 30 grains of the bicarbonate of potassium may be used every four or five hours in water, flavored with cinnamon for the sake of the taste, or the citrate of potassium, which is more agreeable, may be taken in equal amount. Sometimes a little colchicum added to the prescription given above may be useful if the case is very obstinate, as follows:

℞.—Potas. iodidi	℥j to ℥ij.
Vin. colchici rad.	f℥ss.
Syr. sarsaparillæ comp. . . . . . q. s.	f℥vj.

M.—S. Dessertspoonful t. d. after meals.

The other drugs used in acute rheumatism are numerous, but only a few of them deserve attention here. There is abundant evidence on record that full doses, 10 to 30 drops of the fluid extract of cimicifuga if given every five hours will decrease the redness and pain of the joints and shorten the attack in some cases. Again, certain species of rhus, as Rhus toxicodendron, are useful if fresh preparations are at hand. The dose of Rhus toxicodendron is $\frac{1}{10}$ to 1 drop of a tincture made by adding 1 part of the fresh leaves of poison-ivy to 2 parts of alcohol, this dose being taken three times a day. Where the pain seems particularly severe at night this drug is very valuable, according to many careful students of therapeutics.

Nearly every case of acute rheumatism will do better if a strong mixture of lemon or lime-juice and water be taken daily in large quantities.

The *local* remedies in rheumatism are chiefly counter-irritants and sedatives. Thus small or large blisters applied around an inflamed joint after the general systemic excitement is passed, may be of great value in restoring the suppleness of the joint and in aiding in the absorption of the effusion. The remaining local treatment consists in thoroughly painting the inflamed parts with tincture of iodine, if blisters are not used, and in the application of veratrine ointment or iodine ointment around the joint. (See Veratrine, p. 291.)

A most valuable application to the inflamed joints of rheumatism either during the acute stage or afterward when they remain swollen and enlarged, is:

℞.—Ichthyol . . . . ʒiv to ℥j.
Adepis . . . . ℥ij.
M.—S. Apply about the part, and rub in well.

The presence of high fever is to be controlled by the same measures identically as is the high fever of any other disease, by antipyretics, by the cold pack, cold bath, or sponging with tepid or cold water.

Salol, which is dissolved and absorbed solely in the intestine through the action of the juices there present, has been used in the place of salicylic acid with success; but it is worthy of note that, as it contains 40 per cent. of carbolic acid in addition to the salicylic acid, its use in large amounts is dangerous.

RHEUMATISM, CHRONIC.

Chronic rheumatism is one of the most difficult and obstinate diseases with which we have to deal. In some cases the acute form just considered merges slowly into the chronic form; or, in other instances, the disease gradually comes on, increasing, it may be, by exacerbations, or by gradual progression. The treatment of chronic rheumatism is somewhat different from that of the more acute forms, and approaches that of gout in some of its therapeutical indications. In other words, the salicylates are not so useful in these cases as are the iodides and colchicum, so that, in the majority of instances, the prescription of iodide, sarsaparilla, and colchicum, given on page 536, is indicated. When any anæmia or weakness is present cod-liver oil is often of great service, and it is worthy of note that this useful nutritive remedy was first brought into therapeutics by the fish-wives of Holland, who found it useful in the attacks of rheumatism to which their husbands were subjected through exposure.

When the oil is thoroughly rubbed into chronically inflamed joints it is often useful, as well as when taken internally.

The same forms of counter-irritation are useful in chronic rhematism as in acute rheumatism, and a very valuable therapeutic measure in these cases is the use of the Russian or Turkish bath, or an improvised sweat by means of a lamp and a blanket. (See Heat, page 320, and Cold, page 304.) Liniments are always called for for two reasons: First, they relieve pain and do good to the parts, if not from their medicinal properties, at any rate from the rubbing which accompanies their application; second, because they give the patient something to do, or to have done, and therefore impress him with an object lesson that his attendants are attentive and alive to his suffering and need of sympathy and care.

Among the lower classes the belief in liniments is very widespread, and their use will often instil into the minds of the friends a far greater confidence than the most logical of treatments with the liniment left out of the list of remedial measures.

The following liniments will be found very useful under these circumstances:

℞.—Tr. aconit. . . . . f℥ij.
Ol. terebinthinæ . . . . f℥j to f℥ij.
Tr. opii . . . . f℥j.
Liniment. saponis . . . . . q. s. ad f℥vj.
M.—S. Poison. Use as a liniment three times a day.

Or,

℞.—Aq. ammonii fort. . . . . f℥iv.
Ol. cajuputi . . . . f℥j.
Tr. belladonnæ . . . . f℥j to f℥ij.
Liniment camphoræ . . . . . . q. s. f℥vj.
M.—S. Poison. Use as a liniment.

Or,

℞.—Tinc. opii
Tinc. aconit. } . . . . āā f℥iv.
Aq. ammon. fort.
Lin. chloroformi . . . . f℥j.
M.—S. Poison. Use as a liniment to chronically inflamed muscles or joints.

In other instances the greatest relief is obtained by employing the following ointment of veratrine:

℞.—Veratrinæ
Hydrargyri protiodidi } . . . . . . āā ʒj.
Ung. petrolei . . . . ℥j.
M.—S. Use as an ointment over the joints.

The ointment ought not to be widely distributed, and the pulse should be watched, as the veratrine may be absorbed, and depression of a severe character set in.

For the reduction of enlargements of the joints due to the disease, and accompanied in some cases by pain, in others without pain, the following ointments are serviceable:

℞.—Ung. iodinii . . . . ℥j.
Adepis . . . . ʒiv to ℥j.
M.—S. Apply locally.

Or, still better:

R.—Ichthyol . . . . ʒiv to ℥j.
Adepis . . . . ℥j.
M.—S. Rub into the joints thoroughly.

Ichthyol is, however, certainly the most efficient remedy for the joints that we have.

The employment of red flannel over inflamed joints is no better than the use of white and it is never "medicated," as claimed in the stores. The only advantage of red flannel is that, as it is dyed, the wool is often better for not being thoroughly bleached. The disadvantages of red flannel are its staining the clothes and the possibility of its producing irritation of the skin.

RICKETS.

Rickets may be defined as a state of the body of an infant or child in which there is a deficiency of the normal salts of the bones and tissues. Generally the term is applied solely to designate bony troubles, but every practising physician sees cases where the manifestations of rickets are emphasized in gastro-intestinal troubles rather than in bony deformities. The chief causes of rickets in children, aside from the presence of any disease such as scrofulosis, is inanition, that is, non-nutrition of a specialized form, or, in other words, bone salts starvation. This may be after or before birth, and it is quite common to see children, born of mothers ill-fed or whose assimilation of salts is defective, with soft bones or a distinct tendency to rickety development.

The treatment of rickets is therefore largely dietetic and devoted to the improvement of the food and digestion. No part of the body fails in force more than the digestive apparatus in the presence of this disease, probably because the alkalinity of the blood is altered, and partly because the stomach cannot secret properly formed juices from imperfectly supplied glands.

The medicines to be used in rickets are general tonics, digestive tonics and stimulants, and bone tonics and stimulants, such as salts of lime and phosphorus. The general tonics are quinine, cod-liver oil, nux vomica and iron, while the digestive tonics are the simple bitters and mineral acids. The bowel tonics and stimulants are lime salts, phosphorus, phosphate of zinc and physostigma.

The following tonic may be useful in young children of one year or more:

R.—Tr. cinchon. comp. . . . . . . fʒij.
10 drops t. d. after nursing.

If this is placed in a little water sweetened slightly with saccharin it will not be greatly objected to.

A very useful preparation is the following:

℞.—Olei morrhuæ . . . . f ʒ vj.
Syr. calcis lactophosphat. }
Liq. calcis } . . . . āā f ℥ iij.
M.—S. $\frac{1}{2}$ to 1 teaspoonful two or three times a day,

Or a preparation made by Reed & Carnick known as "cod-liver oil and milk" which is partly predigested and is said to contain 50 per cent. of cod-liver oil and hypophosphites. Half a teaspoonful of this preparation slowly increased to a teaspoonful after the morning, noon, and evening meal is often of great service. Nux vomica is generally so bitter as to be rarely administered to young children, and when given only $\frac{1}{8}$ to $\frac{1}{4}$ of a drop of the tincture should be used, three times a day.

Where a distinct scrofulous tendency exists and anæmia is present small doses of the syrup of the iodide of iron is of service, and $\frac{1}{10}$ to 1 drop may be given three or four times a day to a child of six months or a year, thus:

℞.—Syrupus ferri iodid. . . . . gtt. iij. to xx.
Aq. dest. . . . . q. s. f ℥ iij.
M.—S. Teaspoonful every four or five hours during the day.

Or,

℞.—Syr. ferri iodid. . . . . gtt. v. to xx.
Syrup. simplicis . . . . . . q. s. f ℥ iij.
M.—S. Teaspoonful t. d. after meals.

The salts of lime and sodium are of direct benefit to the bones, forming by their presence in health a large proportion of the osseous system, and therefore they may be considered as foods rather than drugs. Very often their administration to nursing mothers or pregnant women saves the maternal teeth from caries and preserves the general health of the mother and child. The following prescription may be used:

℞.—Syr. calcis lactophos. . . . . f ℥ iv.
S· Teaspoonful t. d. after meals.

Or, if something still more active is needed,

℞.—Phosphori . . . . gr. $\frac{1}{6}$.
Olei amygdalæ . . . . f ℥ vijss.
Pulv. acaciæ . . . . f ℥ iv.
Sacchari alb. . . . . f ℥ iv.
Aq. dest. . . . . f ℥ x.
M.—Ft. in emulsio. S. Teaspoonful t. d. after meals.

The reasons for the use of phosphorus are clear, from what has been said of that drug when speaking of it elsewhere in this book (p. 247), since it acts as a direct and powerful stimulant of bone growth.

The following prescription by Kassowitz, who has used the drug very extensively in this affection, will be found useful:

℞.—Phosphori	gr. ½.
Olei morrhuæ	f℥vi.

M.—S. Teaspoonful t. d., after food.

Phosphate of lime and phosphate of sodium are valuable remedies in rhachitis. They are never to be used in large doses, because they will not be assimilated, and will only disorder the stomach. The proper dose of each is 1 to 2 grains, placed in the milk, where their presence will not be noted.

The ventilation of the rooms where a child prone to rickets is kept should be excellent, not too hot or cold, and free from draughts. A cool sponge bath is useful at night if the patient is strong enough, or a good rubbing with salt and whiskey (1 drachm of salt to a pint of whiskey) is of still greater service.

Special attention should be paid to the development of the muscles by massage and passive movements, as these parts are always weak. Walking must not be allowed too early, as it may cause bony deformities.

SCARLET FEVER.

This disease, the most frequently fatal of all the exanthematous diseases of childhood, needs the greatest watchfulness and treatment. Complications constantly arise, requiring skill on the part of the attendant, and it is upon his success in treating these outbreaks of danger, as well as in the general direction of the case, that the life of the patient chiefly depends. It has been claimed by certain practitioners that one or two remedies which they have used act as abortifacients of the attack, decreasing its severity, duration, and the probability of complications. Thus, one European physician has used salicylic acid with wonderful results, if his claims are just, for he found it to prevent all complications, and even to remove them when present. He gives throughout the entire attack, and for some days after defervescence has ensued, the following:

℞.—Acid. salicylic.	gr. xlviij.
Aquæ dest.	f℥ij.
Syr. aurantii . . . q. s.	f℥iij.

M.—S. Teaspoonful every hour during day and every two or three hours at night.

In this country Wilson has employed chloral throughout the entire attack with asserted good results in the following manner, but in our opinion Wilson's method is not the best for most cases, unless the nervous manifestations are very marked, when the chloral treatment is of great value.

The plan is as follows: "So soon as the patient is suspected or known to be developing scarlatina, a laxative dose of calomel, proportionate to the age and general condition, is administered. Shortly thereafter chloral is given in moderate doses, at intervals of two or three hours, or longer, throughout the attack. The dose varies with the age of the child; the frequency of its administration depends largely upon its effect. To infants of two or three years a dose of from 1 to 2 grains may be given, the dosage being gradually increased with older children; that for adolescents reaching 5 grains. The tranquillizing and sleep-producing effects of the drug are, in most instances, promptly realized, the patient falling into a condition of quietude instead of the restlessness and jactitation which are so distressing in the well-developed disease.

The repetition of the dose should not be more frequent than is necessary to maintain this condition of quietude, a condition from which the patient may be easily aroused, and into which he quickly relapses when left undisturbed. It is neither necessary nor desirable to push the drug to the establishment of a deeper sleep. Profound narcotism is, of course, to be avoided. The patient may thus be kept in a condition of light repose throughout the whole duration of the fever. By this means not only is there obtained relief from the restlessness and distress of the active period of disease, but much wear and tear of the nervous system, and some exhaustion from muscular effort, are prevented. Delirium is controlled; the itching and burning of the skin, due to the eruption, are allayed; in a word, the greater number of the distressing symptoms of the disease are favorably influenced by the cautious and prolonged administration of chloral hydrate in efficient doses.

As a rule, the drug is easy of administration, and well borne by the stomach. Wilson has found its acrid after-taste best masked by its administration in Aubergier's syrup of lactucarium diluted, thus:

℞.—Chloralis . . . . gr. xxx.
Syrup. lactucarii (Aubergier) }
Aquæ } . . . āā f℥ss.
M.—S. A teaspoonful in iced water every two, three, or four hours.

The administration of nourishment immediately after the medicine is desirable. The sleep-inducing properties of the drug manifest themselves rapidly, but are not prolonged; therefore, its repetition at intervals of two or three hours is called for.

From the very beginning of an attack to its end, unless diabetes comes on, the child should be supplied with plenty of pure water, and, if possible, this water should be obtained from a spring containing a low percentage of solids, as Poland water, which is widely sold throughout the country. If this is impossible, then Vichy water may be employed, or it may be used by obtaining the granulated Vichy salts sold by most large drug firms, and adding this in small amounts to pure filtered water. This makes an effervescing draught which may be taken while bubbling or not, as the child desires. The object of this treatment is to flush out the kidneys, and so to dilute the effete matters generated in the body by the fever and the germs of the disease that they lose, to a great extent at least, their poisonous and irritating powers.

The convulsions which sometimes usher in an attack are to be treated by 5 grain does of chloral and 10 to 20 grains of bromide of sodium for a child of five to eight years. The convulsions of the advanced stages are often uræmic, and must be so treated.

The further treatment of the disease rests upon the symptoms alone. We cannot cure the patient by the use of remedies, but we can do much toward making the pathway to health smooth and free from pitfalls and obstructions.

Probably the most common complication calling for treatment, when the kidneys have been treated in the way just spoken of, are high temperature, or fever, and sore-throat, or angina. The fever is to be controlled in these cases in precisely the same way that it is in all other conditions in which it is present. It is best to attempt to keep it down below 101°, or at least below 102°, by tepid sponging, which also allays the itching of the skin; or, if the fever still rises, by the use of colder water, or even the cold pack, if the parents will allow it. Generally the popular fear that the application of cold to the surface will drive the eruption "inward" is so strong as to make the cold pack objectionable in the eyes of the friends; but, if the temperature reaches 105°, the physician must assert the fallacy of this belief, and insist on its use. (See Cold Pack, page 313.) If suppression of the rash does occur, we must use the wet pack. Antipyrine and antifebrin, to be sure, may both be used, but it is worthy of note that each of these may produce collapse, or other complication, if large doses are necessitated by obstinate high temperature; and, if these complications ensue, alcohol will be indicated. Quinine has been highly recommended as an antipyretic in scarlet fever, but it is of little value in the majority of cases, simply disordering the stomach and irritating the kidneys, if used in doses large enough to be effective. Where the head seems particularly hot and the fever is high, an ice-bag or a head-coil of rubber tubing is to be employed, through which may circulate water at whatever temperature is thought best.

The treatment of the sore-throat of scarlet fever is an important part of the care of the child in many cases. Small pellets of ice may be held in the mouth, and an ice-bag applied to the outside of the throat. This is done by finely breaking up some ice and placing it in a thin India-rubber bag about the neck, the surface of the bag being covered by a cloth, to prevent too rapid melting of the ice and the wetting of the clothes by the condensation of moisture on the face of the bag. This should be used during the entire attack, if needed, and renewed as often as it becomes at all warm from the heat of the body. By this means the redness of the fauces and the swelling of the glands of the neck are prevented or relieved. Chlorate of potassium may be used in a spray or on a swab, but never internally, owing to its irritant effects on the kidneys and stomach and its general influence on the blood.

In some cases where the eruption fades, or is never very prominent, it is of the greatest importance that it be made active, as under these circumstances the child may be placed in the warm wet pack, and, if the head is very hot, cold applied to the vertex and throat, while the body is enveloped in the blanket. (See Wet Pack.) This often brings out in an hour or two a bright scarlet rash, and the child falls asleep and wakes up free from delirium and high fever.

The itching and burning of the skin in many cases of scarlet fever are annoying symptoms, and they may become really dangerous. The author has recently carried out a series of experiments showing that fever of high degree can be brought on solely through nervous irritation, thus explaining a fact long well known to clinicians, namely, that the relief of this dermal irritation in scarlet fever may be followed by a fall of temperature. To relieve this symptom it will often be found advisable to cover the entire skin with a thin layer of vaseline or cosmoline, or benzoated lard, or, in other cases, as an antiseptic and local anæsthetic carbolic oil may be applied (2 drops of carbolic acid to each 2 ounces of olive oil). In other cases almond oil may be used.

If nephritis comes on and is a pressing condition the greatest care is necessary, and the object of the physician must be to make the skin, disabled as it is, carry out a sufficiently active eliminative function to relieve the kidneys of any strain, to relieve dropsy, and to aid in the removal of effete matter by catharsis. These effects are best attained by the use of pilocarpine; $\frac{1}{6}$ grain by the mouth, to a child of ten years may be used, or $\frac{1}{10}$ grain hypodermically. If cardiac weakness exists this cannot be done and we are forced to the use of from 5 to 10 grains of compound jalap powder to a child ten or twelve years, to which should be added 10 grains of bitartrate of potassium to increase its efficiency. Sweating may also be produced by the employment of heat obtained by the use of bottles of hot-water or hot bricks placed about the patient, who is first wrapped in blankets so that the bottles cannot burn the skin and so arranged that sweating will come on. The thermometer must be placed in the mouth to foretell any danger from heat-stroke if the sweat should fail to appear

The after-treatment of scarlet fever, during convalescence, consists in the use of Basham's mixture or the tincture of the chloride of iron and in the employment of simple bitters, strychnine, or quinine. Fresh air, sea air, or mountain air are useful, and colds or exposure to cold air or draughts is to be carefully guarded against.

SCIATICA.

Sciatica is an exceedingly obstinate affection, in the majority of cases resisting the best treatment for weeks. It seems to be due to rheumatic taint in the majority of instances and may sometimes be cured by the remedies used and described under the heading of acute or chronic rheumatism. In other instances it is due to injury or jarring of the nerve, as by heavy persons stepping off from a high step to the hard ground. Thus the most obstinate case ever seen by the writer was one in which a stout man weighing about 250 pounds acted as "coupler" on a switching engine, and though wonderfully agile for his weight provoked the disease in the leg on which he always first struck the ground when jumping from the platform of the moving locomotive.

The treatment for all cases is both internal and external. The internal treatment may be the same as that already described under acute or chronic rheumatism or in other instances consist in the use of large doses of bitartrate or citrate of potassium, 40 grains three times a day in plenty of water to aid in the maintaining of free kidney action. At the same time the amount of coffee and tea should be cut down as much as possible, and lemonade, strongly acid, be taken freely during the day. If the pain is very excessive, morphine should be given, or antipyrine or antifebrin may be used.

The local treatment of sciatica is quite various. One of the favorite methods is to inject deeply into the flesh, just over or about the exit of the nerve from the pelvis, 10 to 20 minims of chloroform, while other physicians prefer acupuncture, the needle being driven down until the sheath of the nerve is punctured. Still another useful method is to take a strong glass rod with a round, smooth end, and after anointing the skin over the course of the nerve with a little ichthyol ointment or lard, to pass the end of the rod back and forth over the tender area, using as much pressure as can be borne. By this means massage or pressure on the nerve is accomplished. In other cases the daily use of an ether or rhigolene spray over the part is effective, or kataphoresis may be resorted to.

The liniments recommended in chronic rheumatism may be tried, and cod-liver oil is of service in obstinate cases. Sometimes nerve-stretching must be resorted to.

Deep hypodermic injections of chloroform, 10 to 30 minims, may be made toward the nerve, or, instead of the chloroform, $\frac{1}{8}$ to $\frac{1}{4}$ grain of morphine in 30 minims of water, distilled and sterilized, may be used with equally good results and less danger of sloughing.

SCLERITIS.

Scleritis, or inflammation of the sclera, consists in a bluish-red, somewhat elevated patch, with implication of the overlying episcleral tissue (episcleritis). In the earlier stages pain and photophobia, if present, require atropine and boric acid and compresses of hot water; later, the infiltration may be subdued with yellow oxide ointment, associated with massage. If the disease spread and implicate the cornea and iris, the treatment useful in ordinary iritis is indicated. In stubborn episcleritis, without iritis, which does not yield to these measures, eserine, usually accompanied by pilocarpine sweats, should be tried, and even the actual cautery has been recommended. The disease in many instances is associated with rheumatism, syphilis, scrofula, anæmia, and menstrual disorders—these must always receive the needed constitutional treatment, especially if iritis or keratitis ensue. Scleritis is a disease hard to eradicate and subject to frequent relapses.

SCROFULOSIS.

Scrofulosis is to be treated by hygienic measures rather than drugs; fresh air, residence by the sea-side, proper out-door exercise, massage and dietetics, all take precedence of medicines.

If these necessary adjuncts to a cure are obtainable the prognosis is fair, to say the least, and the following drugs may be used, all of them being devoted to the improvement of the general health, and not to any direct influence over the scrofulous tendency in itself. It is hardly necessary to state that cod-liver oil, or its supposed active principles combined under the name of morrhuol, is, perhaps, the best remedy of all. The oil should be given in emulsion, being first pancreatized and so prepared as to be somewhat palatable by the addition of flavoring substances, if the child is old enough to appreciate such flavors. In young children, while distaste to the oil is often shown at first, a liking for it rapidly develops, so that the writer has seen children cry for it when, through his orders, the oil was discontinued. It is nearly always best to combine the lactophosphates or the hypophosphites with the oil when it is given in these cases. Whenever anæmia is present syrup of the iodide of iron is useful in from 1 to 10 drop doses, according to the age of the child, as follows:

℞.—Syr. ferri iodid. . . . . ʒss to f℥i.
Aq. dest. . . . . q. s. f℥iij.
M.—S. Teaspoonful in water t. d., after meals, to a child of one year.

In these same cases $\frac{1}{60}$ grain of arsenious acid or the same amount of corrosive sublimate may be given to a child of three or four years, or half these amounts to a child of one year, by using the following solutions:

℞.—Acid. arseniosi . . . . gr. $\frac{1}{10}$ to gr. $\frac{1}{5}$.
Aq. dest. . . . . f℥ij.
M.—S. Teaspoonful every five hours, after food.

℞.—Hydrarg. chlor. corros. . . . . . gr. $\frac{1}{10}$ to $\frac{1}{5}$.
Aq. destil. . . . . f℥ij.
M.—S Teaspoonful every five hours, after food.

The use of the iodides is generally contra-indicated in those cases where softening and breaking down of the glands are going on rapidly. In their place we may employ the phosphates of lime or sodium in from 1 to 2 grain doses several times a day, and if suppuration is active the sulphide of calcium, given by placing 1 grain of it in half a tumblerful of water and giving a teaspoonful hourly. This mixture should be made fresh every day to prevent its becoming oxidized.

Where enlargement of the cervical glands takes place iodine ointment, diluted with one-half of lard, should be well rubbed in twice daily, but stopped at once if any signs of softening or fluctuation appear, or if the skin becomes reddened. Where these enlargements are persistent, ichthyol ointment is to be rubbed in as follows:

℞.—Ichthyol . . . . ʒj to ij.
Adepis . . . . ℥j.
M.—S. Apply locally.

If this is not followed by the cure, the gland should be excised or scraped and packed with iodoform as in the majority of cases they will be found to be distinctly tuberculous.

SCURVY.

Scorbutus is dependent so largely upon dietetic lawlessness and its cure is so completely dependent upon the use of proper foods that almost no drugs are to be employed in its treatment. The avoidance of all salt meats, or more important still, the avoidance of those foods, be they what they may, which have caused the disease in a given case, is to be practised.

The only remedies particularly indicated are lemon-juice or lime-juice, or citric acid, the latter being far less valuable in all cases than the juice of the fresh fruit. Where lemon-juice causes indigestion, this effect may be avoided by boiling the lemonade and allowing it to cool. The boiling precipitates certain poisonous and irritating albuminoids and the supernatant liquid when taken away is devoid of any evil influence, and may be cooled and sweetened to suit the taste of the individual concerned.

SHOCK.

The medical treatment of shock is very important, and the life of the patient depends upon its proper care by the attendant, but before describing the treatment it is in place to consider the causes of the condition and the state of the patient so that we may understand the methods indicated. Every physiologist recognizes the fact that the body, particularly in its most vital parts, is controlled by inhibitory and accelerator nerves or nerve cells, which govern the functions of every organ. Normally these two forces of inhibition and acceleration act in such a way as to be perfectly balanced, but abnormally they may either of them become excessive and overcome the other. Further than this we must remember that all conditions of great functional activity are ultimately followed by a reaction which amounts to depression or exhaustion.

Shock consists in an overstimulation of the inhibitory apparatus of the heart and the respiration, which is ultimately followed by exhaustion of inhibition so that the pulse and breathing become rapid and shallow instead of slow. Various degrees of shock can be readily recognized and the severity of the condition always depends upon the constitution of the individual. Every one has heard a nervous woman say "You frightened me so that my heart stood still," and again a moment after "Just feel how fast my heart is beating," and we all of us know how any severe and sudden shock causes these changes to some degree in the pulse. The same mechanism is the cause of shock in railway or other injuries, only it is much more severe, owing to the actual injury received, and its accompanying terrors. Many of the readers of this book probably know that a violent blow upon the belly walls, just over the solar plexus, will cause death, even in so large an animal as the ox, and every boy has had the "breath knocked out of him" by a blow of sufficient feebleness not to be lethal in its influence. When a dog or other animal is examined after such a death, the heart is always found in wide diastole, because the excited vagus nerve has held it open and prevented contraction until the absence of blood in the brain results in death.

This period of inhibitory excitement, when it occurs in man without being severe enough to cause death, speedily gives place to inhibitory exhaustion and we have a rapid pulse from inhibitory palsy, while through the palsy of the vaso-motor system the bloodvessels are relaxed and the normal resistance to the heart is taken away. The heart beats wildly and fast for the same reason that a locomotive's wheels fly round when the track is slippery, or in other words, normal resistance is lost.

The capillaries in the second stage of shock are dilated and the skin is relaxed, moist, and cold from excessive dissipation of heat.

This is the more prolonged stage of the two and they both need active treatment.

The patient will rarely be seen in the first stage of shock, simply because by the time the physician reaches him the second stage will have come on. In either event, the principal things to be done are the administration of $\frac{1}{60}$ to $\frac{1}{50}$ grain of atropine hypodermically, and the application of external heat to maintain the bodily temperature, the fall of which is a factor of great importance, but generally overlooked in attending to an operation or other measures. The use of the atropine is peculiarly a triumph of therapeutics and rests upon logical deduction. It will be remembered that atropine in full dose acts as a depressant to the vagus nerve, and as this nerve is over-active in the first stage the drug acts as a sedative to it. This is, however, a comparatively unimportant fact, for it is another action of atropine which makes it valuable. If the vagus be very much stimulated, a safe dose of atropine cannot quiet it, but in the second stage, which we most commonly have to treat, a safe dose does not act upon the vagus but upon the vaso-motor system, and by preventing the dilatation of the bloodvessels of the body thereby provides blood-paths of normal tone and tenseness, which do not hold all the blood in stagnant pools where it is not needed, but carry it to the brain and vital parts. Digitalis is a useful adjuvant to atropine because of its powerful vaso-motor and cardiac influence. Twenty drops of the tincture should be given hypodermically and repeated in an hour if the pulse does not show the influence of the drug at the end of that time.

The application of heat in the form of hot-water cans, hot bricks or bottles must not be forgotten, care being taken that the patient is not burnt. (See article on Heat, page 320.)

SMALLPOX.

The treatment of smallpox is not specific, simply because it is one of those diseases which run a given course, and which we cannot abort. We can only treat the various symptoms which present themselves, and by the modification of these manifestations prevent complications and sequelæ to some extent. The fever is to be treated as is any fever of this class. Often it can be allayed by a mixture containing tincture of aconite, spirit of nitre, and spirit of Mindererus (liquor ammonii acetatis), while the headache or backache may be controlled by antipyrine or acetanilide. Insomnia and restlessness, if excessive, are to be quieted by the bromides or chloral, care being taken that the doses of the latter are not large enough to depress the heart. It must be remembered that the time of onset of the secondary fever, the eighth day, is one of grave import to the patient.

Before its arrival the treatment of the case must be so managed that strength is saved for this strain, and tincture of the chloride of iron, in 5 to 10, or even 20 drop doses, may be resorted to give strength to the patient and to affect specifically the pyæmic fever. The pulse should be watched, and if it flags, brandy and whiskey should be freely but wisely used.

The peripheral irritation and itching of the eruption are partial causes of the fever, and produce much unrest and nervous irritability. The condition of the skin is, therefore, to be looked after, and the pitting prevented by every means in our power, particularly on the face. One of the means commonly employed is the use of flexible collodion, and another application is glycerite of starch or simple cerate applied in a heavy coating. Some physicians recommend inserting the tip of a nitrate of silver stick into each vesicle as it ruptures, to prevent pitting. Sometimes anointing the entire body with sweet oil, slightly carbolized (1 to 100), is useful to check irritation.

If the mouth is sore a mouth-wash of chlorate of potassium and water may be used, flavored with a little tincture of myrrh.

Disinfection, good ventilation, and the avoidance of much light are necessary.

STINGS AND BITES.

The stings of nearly all small animals depend for their activity upon formic acid, and are to be relieved by the use of dilute alkaline liquids, or, better still, by the application of ammonia, or, instead, an application of ordinary or flexible collodion may be made, which is improved in its action by the addition of 1 part of mercury bichloride to 1000 of the collodion, or, if preferred, salicylic acid may be added in the proportion of 5 grains to the ounce. Sometimes a solution of carbolic acid, 1 to 100 or 1 to 50, when sponged over the parts exposed, not only relieves the itching of mosquito bites, but keeps away the mosquitoes. In other instances the stings are relieved and cooled by the use of dilute or pure vinegar.

In snake-bite the best treatment is that introduced by Weir Mitchell and Reichert, namely, the local application of permanganate of potassium to the part, which should be thoroughly filled with the drug, and full doses given hypodermically about the wound, diluted three-fourths with water, and followed by full doses of alcohol internally.

The secret of success consists, however, in the use of a ligature or a cleansing of the wound as soon after its reception as possible, thereby preventing the absorption of the poison.

STYES.

Styes consist in a localized inflammation of one of the glands in the margin of the lid or the surrounding connective tissue. Before suppuration is established abortive treatment may be practised by an inunction with a salve of the red or yellow oxide of mercury (grs. 8, ℥j), by painting the surface with an ethereal solution of collodion, or, according to Abadie, by the application of a saturated solution of boric acid. Pain may be alleviated with hot compresses (water 110° F.), frequently changed, and as soon as pus appears incision is necessary. Associated conjunctivitis requires a boric acid solution for its relief. It should be remembered that styes indicate ill health, that tonics are indicated, and that they most frequently appear in the subjects of refraction error. They tend to come in crops, and the internal use of sulphide of calcium has been recommended.

SUNSTROKE.

Sunstroke, or, more correctly speaking, heat-stroke, is an affection produced by exposure of the body to any form of high temperature, whether the source of heat be the sun, a furnace, or the radiation of heat from the earth. For this reason the condition may occur at midnight or midday.

Heat-stroke is to be divided into two classes, in one of which excessive exposure to heat upsets the balance of the thermal mechanism of the body so that fever comes on (thermic fever), in the other the temperature is lowered, and forms the condition known as heat exhaustion.

The condition of thermic fever is much the more common of the two, heat-exhaustion being rare.

The danger of thermic fever is that the excessive heat may cause coagulation of the myosin in the heart-muscle and of the protoplasm in the brain, and cause death, or that the same result may be reached by paralysis of respiration.

The danger of heat-exhaustion is that death may ensue from collapse due to a general failure of vital power and the chilling of the body. In heat-exhaustion, too, the vascular system is greatly relaxed and depressed, and the circulation is at its lowest ebb.

The treatment of these two states is, of course, radically different. When a patient has thermic fever, and is brought under the care of the physician, the first thing to be done is to loosen the clothing—if possible, remove it—at the same time applying cold to the body, and particularly to the abdomen, back, and chest. Better still, he may be stripped, laid upon a bed, covered with a rubber blanket, and ice-water applied by means of a sponge, or a piece of ice laid on the belly, while another piece is rubbed over the rest of the body.

Care should be taken that the temperature, when it once begins to fall, does not drop suddenly below the normal and cause collapse. If the clinical thermometer in the mouth or rectum shows that the temperature has fallen to 100.5° F. or 101° F., the cold application should be stopped, and the patient allowed to lie on the bed only covered with a thin sheet. The bodily temperature must be constantly watched, as it will probably bound up again in a few minutes, and require the application of more cold used with the same care. This second rise is due either to the disorder of the nervous mechanism of heat production and dissipation, or to the fact that, while the surface of the body is cooled by the ice, the innermost viscera are still in high fever and rapidly heat the surface as soon as the ice is taken away. Antipyretics have been found to be almost useless in the hyperpyrexia of sunstroke, and, to say the least, are not to be relied upon. After the fever has been reduced permanently, the danger is not all passed, and it is the greatest mistake to discharge a patient as cured at this time. After two or three days it is very common for a condition of meningitis to develop, accompanied, it may be, by little or no fever, but characterized by violent darting headache, which is made worse on lying down or on sudden movement. The treatment of this state must be bold, and venesection is the only safe method of obtaining relief, although vascular sedatives, such as veratrum viride, may be employed. The bleeding should be enough to impress the circulatory system to some degree, and may be done by using any of the prominent veins in the arm. Sometimes a violent attack of epistaxis saves the man's life, when it would have been lost through the ignorance of his attendant, for even if life is preserved without vascular depression, secondary changes in the brain may ensue and produce hemianopsia, optic atrophy, imbecility, or insanity. Quinine, salicylic acid, and similar substances, are all contra-indicated because of the congestion of the meninges to which they predispose by their physiological effects.

The treatment of heat exhaustion consists in the use of heat instead of cold, in order to restore the bodily temperature. Just here, however, must be uttered a word of warning, namely, that the mere fact that the skin is cold does not prove the case one of heat-exhaustion, since a rectal thermometer may show the central or real temperature of the body to be really in hyperpyrexia. Of course, such a case should not receive heat, but cold injections, if the symptoms require it.

The bodily heat in heat-exhaustion is to be raised by placing the patient in a bath at 105° to 110°, or by the use of hot bricks or bottles, care being taken that they do not burn the patient if he is conscious. The bodily temperature should also be watched, lest the other extreme of heat be reached.

These cases are not so apt to have meningitis, but they are generally slow to convalesce, and require tonics for a long time. Indeed, in many instances, the system seems to receive a shock from which it takes several weeks or months to recover.

SYPHILIS.

In so far as the choice of drugs is concerned the treatment of syphilis is exceedingly simple: iodine, iodide of potassium, and mercury practically represent the only remedial agents which are well proven to counteract distinctly the effects of the disease.

In regard to the method of administration, and the period of the disease in which any or all of these drugs can be given to the best advantage, there is a wide diversity of opinion. Following the teaching of Fournier, in this country the practice generally obtains of administering mercury on the appearance of the first symptoms of the secondary stage of syphilis; this drug is continued for from twelve to eighteen months, and is then followed by a course of iodide of potassium continued for from six to twelve months. If, after the suspension of this treatment for six months, no manifestations of disease appear, the patient is regarded as cured. Should the disease again break out, the iodides are administered in increasing doses, supplemented by the addition of mercury if necessary.

Against this treatment, however, there have been many and vigorous protests. Every syphilographer knows that the disease is frequently self-limited. Zeissl states that a large number of cases progress to spontaneous cure, and that the secondary eruption in such cases disappears in from two to eight months, after which time the patient is perfectly well, recidivity being far less common than when mercury has been employed in the early stages of the disease. The treatment by iodides, he thinks, should be commended, chiefly after the expectant plan; their effect is not so rapid as is that of mercury; they are suitable, however, to all stages of the disease. When the symptoms become so urgent that it is no longer safe to depend upon iodides, mercurial inunctions should be employed, the dosage of the drug being regulated by its effect upon the symptoms, in all cases the minimum quantity necessary to accomplish the result being administered.

We have, then, three methods of treatment proposed, each advocated by a formidable array of authorities:

1. The expectant treatment.
2. The treatment by iodides, followed, if necessary, by mercury.
3. The continued treatment, beginning with mercury, and ending with iodide or with the combination of the two drugs.

By the expectant treatment is implied abstinence from all medication intended to counteract directly the syphilitic virus; if possible the patient should lead an active, out-of-door life, the diet should be most carefully regulated, and the treatment should be purely symptomatic, tonics being administered when required, the sore-throat being combated by astringent gargles, particularly those containing chlorate of potassium or malic acid, together with direct local applications, and the eruption of the exposed parts of the body being controlled by the application of heat. The objection to this treatment lies in the long persistence of the secondary eruption. Where the primary lesion is large and persistent; where the period of secondary incubation is less than seven weeks; where the papular eruption is universal, is confluent, and is accompanied by the simultaneous appearance of mucous patches; where the lymphatic enlargement is very marked and persistent; and where the disease attacks a depraved constitution, the expectant plan offers little hope of accomplishing a cure. Here the second and third methods of treatment are clearly indicated.

By the second plan of treatment the iodides are administered, not immediately on the appearance of the secondary eruption, but after this has run a course of several weeks, and is steadily increasing in severity. The iodide of potassium is chosen by preference, beginning with the administration of 5 grains, three times a day, and increasing steadily 5 grains a day until either the constitutional effects of the drug are manifested or the symptoms are favorably influenced. Should iodism appear the dose is cut down one-half, and continued for one or two weeks, after which, if the syphilitic lesions are not favorably modified, inunctions of mercury are employed, a drachm of mercurial ointment being rubbed in every other day. The iodide should be continued for from six to twelve months after the disappearance of all symptoms, relapses being combated by temporarily increasing the dose and by a course of mercurial inunctions; if after the suspension of the treatment the patient remains free from all manifestations of syphilis for two years he can fairly be considered as cured.

By the third method of treatment, and this is the method most commonly accepted in practice, the patient is placed upon mercury the moment the early secondary symptoms denote that the primary sore was surely syphilitic. Many surgeons begin this treatment from the time that the inguinal glands on both sides becomes characteristic in shape and size. Others wait until there is general lymphatic involvement, while others believe that the mercury should not be administered until roseola appears.

In regard to the particular preparations of mercury to be employed, the protiodide, blue mass, bichloride, and the mild chloride represent the forms usually employed when the drug is administered by the stomach. Of these the protiodide is to be preferred, and the effort of the surgeon is directed first toward determining what has been termed the "tonic" dose. With this end in view, ¼ grain of protiodide of mercury is given in pill form, three times a day; every second day this quantity is increased by one pill, the patient being carefully watched in the meantime. The drug usually manifests its physiological effects by griping pains accompanied by two or more watery passages from the bowels, or by fœtid breath and slight tenderness of the gums. The quantity taken to produce this effect represents the extreme limit to which it is safe to push the drug. If this dose is continued or increased the characteristic symptoms of mercuric saturation appear. When the surgeon has determined the limit to which the drug can be safely pushed, this dose is cut down one half, and, in the absence of further complications, the patient is directed to continue this treatment for eighteen months. If, during this time, local symptoms appear, which show that the disease is not thoroughly under control, the mercury must again be pushed to the full doses, being reduced to the tonic dose as soon as the disappearance of specific lesions permits. Where comparatively small doses of the protiodide produce pain and purging opium may be added; in this case the breath and the mouth will show when the full effect of the medicine is obtained. Manifestations of the disease occurring during mercuric treatment must receive local treatment. The surface eruption is combated by mercuric ointments and washes, and by the application of heat. Mucous patches in the mouth are quickly healed by applications of solid nitrate of silver or sulphate of copper, 20 per cent. chromic acid solution, or the acid nitrate of mercury. When these patches occur about the genitals, washing with 1 : 2000 bichloride solution and dusting with calomel and bismuth will be found satisfactory. Alopecia is combated by shampooing and by the application of strong stimulating lotions containing croton oil or tincture of cantharides.

The intense cephalalgia is combated by $\frac{1}{6}$ grain doses of calomel, repeated every two hours. The periostitis yields most readily to gentle long-continued mercuric inunction, supplemented by the application of pressure bandages.

When the integrity of any vital organ is threatened there should be no hesitation in pushing the mercury treatment and in supplementing it, if favorable results do not follow promptly, by large doses of iodide of potassium.

After the first eighteen months iodide of potassium is generally indicated. This is commonly given together with the mercury, constituting the mixed treatment. The following formula, or one similar to it, may be employed:

℞.—Pot. iodid.		ʒij to ʒiv.
Hydrarg. chlor. corros.		gr. jss.
Syrup. aurant. cort.		f℥j.
Aq.	q. s.	f℥ij.

M—S. fʒj t. i. d.

This mixture, or iodide of potassium without the mercury, administered in 5 to 10 grain doses three times a day, is continued for from six to twelve months longer. When the iodide is given alone it is most conveniently administered in the form of a saturated solution. Of this a drop contains a grain of the salt; milk seems to have the power of completely disguising the disagreeable taste of the drug. Thereafter, specific treatment is stopped, unless symptoms arise, in which case it should be renewed, and should be continued for many months.

The protiodide is usually preferred, because the symptoms of its constitutional effect are manifest at first in the bowels, and because, in practice, it has been found one of the most satisfactory of all preparations. Where this form of mercury is not well borne the surgeon should at once employ some other salt; the bichloride, in $\frac{1}{12}$ grain doses three times a day, is efficacious. Blue mass will often act favorably when other preparations cannot be tolerated. Its combination with iron is desirable, and the following formula represents one of the most valuable of the antisyphilitic pills:

℞.—Mass. hydrarg.	gr. xxiv.
Pulv. ferri sesquichlor.	gr. xij.

M.—Ft. pill. No. xii. S. One t. i. d.

Where mercury cannot be administered by the mouth it may be given by means of vapor baths, by inunctions, and by hypodermic injections. The vapor baths are useful when it is desired to cure promptly eruptions on the surface of the body, or when it is most important to bring the disease quickly under the influence of mercury. They are readily administered, the only apparatus required being an alcohol lamp, and a plate in which the mercuric preparation can be volatilized. The patient is seated in a chair entirely naked, several blankets are wrapped around his neck, and beneath the tent thus formed a large vessel of steaming water is placed. When the skin is thoroughly softened $\frac{1}{2}$ drachm of calomel is sublimated by means of the lamp. These baths may be repeated every night until the mercuric fœtor of the breath is observed, or until the specific symptoms disappear.

Inunction represents the most efficient way of administering the mercuric treatment. When the stomach is intolerant of drugs, or when, administered by the mouth in full doses, they do not favorably modify symptoms, inunctions are indicated. Either the oleate of mercury, ten per cent., or the ordinary mercury ointment is commonly employed; the former is somewhat more cleanly. The rubbings should be done by the patient, should be made over a large surface of the body, and should be done thoroughly; 1 drachm of blue ointment is rubbed in daily. The patient is instructed to take a warm bath, the mercury is then well rubbed in over the inner surface of the forearm and arm, the axilla, and along the side of the chest, for fifteen minutes. A shirt kept for this purpose is then put on next to the skin and the ordinary clothing is worn over this. The next night the opposite arm and side of the body are utilized as the seat of inunction; the next night the right groin and the inner surface of the right thigh and leg; next, the same regions of the opposite side of the body; finally, the anterior surface of the chest and abdomen. In this way irritation of the skin is avoided. Where it is impossible to employ the inunctions in this way another means of causing absorption of mercury through the skin, suggested by Sturgis, will be found satisfactory. After a thorough soaking of the patient's feet in hot water, from $\frac{1}{2}$ to 1 drachm of a 20 per cent. oleate of mercury is rubbed vigorously into the sole of one foot; the next night the sole of the other foot is treated in the same way. The patient is directed to wear night and day a pair of woollen socks; these are not changed for one week. Mercury may be taken by the mouth at the same time inunctions are employed, when it is desired to influence the system quickly. In the late periods of the disease very striking effects are often obtained by supplementing the iodide treatment by a course of twelve to eighteen inunctions.

The hypodermic administration of mercury is, in this country, limited to those few cases which do not seem to respond to the drug when given by the mouth or by the absorbents of the skin. Although many preparations of mercury have been lauded as most efficacious when used hypodermically, the best formula seems to be that recommended by Hebra; this consists of a solution of 1 per cent. of bichloride of mercury in a 6 per cent. sodium chloride solution; the resulting mixture is perfectly clear and is readily prepared. If it becomes turbid it should be thrown away. Most rigid antiseptic precautions must be observed, as abscess formation is not uncommon. One injection is given daily, from $\frac{1}{12}$ to $\frac{1}{6}$ grain of the sublimate being administered. The nates are selected as the seat of the injection, the solution being driven well into the muscles of each side every other day. Twenty injections are usually sufficient to cause the disappearance of all symptoms. The employment of the insoluble preparations of mercury, particularly of calomel, gives much pain, frequently causes abscess, and is, at times, attended by a continuous absorption, which may produce severe and even fatal ptyalism.

The ulcerations often found as tertiary manifestations of disease are treated according to general surgical principles. The local application of mercuric preparations is of less service than in the secondary lesions. Iodoform is peculiarly serviceable.

The tonic and general treatment of syphilitic cases must not be forgotten, fresh air, exercise, bathing, careful diet, reuglar living, all must be enjoined. Moreover, in certain cases where there is marked anæmia or physical weakness, cod-liver oil, stimulants in moderation, compound syrup of hypophosphites, and other tonic and nutritive courses of treatment must receive careful attention.

Although the treatment of an ordinary case of syphilis is simple and is satisfactory in its results, it must be remembered that there are malignant forms of the disease, attacking by preference feeble and cachectic individuals, running a rapid and virulent course unchecked, nay aggravated, by specific treatment, and responding feebly, if at all, to the most careful hygienic and tonic regimen.

TETANUS.

The treatment of tetanus is quite independent of its causation so far at least as drugs are concerned, and it is virtually identical with that of strychnine poisoning, to which the reader is referred. (See Nux Vomica, p. 229.)

TUBERCULOSIS.

Under this head will be considered pulmonary tuberculosis as a type of all forms of this morbid process. Its treatment may be placed in two lines—the first devoted to the cure of the disposition or inclination toward the disease, or the abortion of its early stages; the second directed to the improvement of the patient's condition, so that his progress through the disease may be made as comfortable as possible. Before doing this, however, it is proper to state that prophylaxis, or true prevention, is the best object to be sought after. Recent studies have shown most conclusively that tuberculosis is capable of being transmitted from man to man or from husband to wife, if the air laden with bacilli is breathed, and the lungs are in a fit state of depressed vitality, from any cause, to afford a favorable field for the growth of the germ and the development of its poison.

Cases of pulmonary consumption follow, rudely speaking, three well-defined lines. A very early stage sometimes comes to the care of the physician, and it is that in which the following history is given or a similar story is elicited. A patient, previously strong and well, or of poor health as the case may be, begins to lose vivacity. Life becomes a burden and exercise is distasteful. A slight daily morning or evening chill and fever develop, and the physician who has been careless treats the case as one of mild malarial poisoning. Examination, however, will show an area somewhere in the lung, generally near the apex on either one or both sides, where slight prolongation of expiration with a harsh inspiratory sound is heard, and where percussion will give impaired resonance or dulness. In other words, the first stage of phthisis is present, and the physician may resort at once to active measures for the patient's relief, which will be considered in a moment.

In another form a chill, a sweat, a sudden loss of flesh and vigor, with, more prominent than all, a hard cough, sudden in its onset and rapidly becoming excessive with profuse expectoration are the dominant symptoms. The wasting is extraordinary, the sweats are constant, and death may come in one or two weeks. This is the form known as "galloping consumption."

The third variety is ushered in by a gradual loss of vigor or a sensation of being a little unwell, or is brought before the patient's mind by a sudden acute hæmorrhage or several rapidly succeeding hæmorrhages. This variety drags out its course more or less rapidly. Sometimes death soon ensues from a fatal hæmorrhage, in other cases it keeps on for months and the case dies from wasting.

Last of all, the fourth class is made up of persons who gradually pass from bad to worse. First they "catch a cold," which hangs on longer than it ought to, and, as soon as they are well, this is followed by another one which is harder to cure, until finally there is always a cough. Soon wasting comes on gradually, strength is lost, and a long period of months or years ensues during which the progress of the case is now slow, now fast, now better, now worse, until death ensues from wasting, or pneumonia, or some other complication.

These forms and stages have been roughly outlined so that a discussion of their treatment might be taken up with a clear idea of what is to be done.

When a patient exhibits the physical signs given as evidences of the early beginnings of phthisis, the physician should institute certain hygienic and medicinal measures. If the individual be earning a livelihood by following some confining occupation, this occupation must be given up and one undertaken which is carried out in the open air and yet not accompanied by too great exposure. Even if exposure is incurred it may be better than the occupation already followed. Thus if the patient be a bookkeeper, a printer, or a bookbinder, or a clerk kept much at a desk in an ill-ventilated room a few wettings in the rain, if properly treated by the wearing of flannel shirts which when wet are changed as soon as labor ceases, will do little or no harm, the danger of catching cold being at a minimum. If the case is wealthy enough to be able to obtain a change of climate and to stop all labor, only taking exercise for pleasure or health, this change is, of course, of value. Some of these patients do better in a high, dry air and others in a lower and more moist atmosphere, the first being represented by that of Colorado and Saranac Lake in the Adirondacks, the second by that of Florida.

In the majority of cases, however, some more moderate, or half and half, climate is useful, and this can be obtained in Lower California, as at San Diego, a place where they virtually have perpetual summer. In other words, such a spot is one where a patient can remain the year around, and, if well enough, engage in business, avoiding the cold, sharp March winds of the Middle, Eastern, or

Western States, and the necessity of leaving Florida on the advent of summer.

Physicians have attempted for years to formulate rules for phthisical patients as to the climate to be sought. In the majority of cases the various health-resorts have to be chosen by experiment, not by judgment beforehand. It is probably true, however, that high altitudes, and rarefied air, are not to be sought where a distinct tendency to hæmorrhage is present, unless the ascent or removal to the rarefied air is very gradual, several weeks being passed before the lung is exposed to the low pressure of great heights.

The following excellent and concise advice, given by the author's friend, Dr. W. Hale White, in his book on *General Therapeutics*,[1] is so worthy of repetition that it is here given. He says: "It is of such importance that only suitable cases should be sent to high altitudes, that we must point out those that are unsuitable:

"1. Those in whom there is considerable affection of the bronchial tubes; for the dryness of the climate increases the kind of bronchitis which commonly accompanies phthisis.

"2. Patients with much emphysema or bronchiectasis; because of the probably diminished absorption of oxygen, and the difficulty of respiration experienced on first arriving.

"3. Patients with disease of the heart must not go to a high altitude, because of its effect upon the pulse and upon respiration.

"4. Cases liable to acute febrile attacks, whether or not these indicate an occasional increase of mischief in the lungs, should remain on a low level.

"5. Patients who are very excitable, or suffer from insomnia, should not go, for a visit to a place at a great elevation promotes these symptoms. Women do not acclimatize so well as men.

"6. Cases in which there are very extensive lesions, or which are very advanced, are unsuitable.

"7. Pneumonic phthisis, if at all acute, is made worse by a high altitude.

"8. Patients who cannot take exercise should not go.

"9. The very old and the very young had better be treated at home.

"10. Sir Andrew Clark (*London Lancet*, January 5, 1889) states that patients who go to Alpine health resorts suffering from albuminuria, or those who develop it whilst there, seldom derive any good from their change."

"There are many conditions which have been thought to contra-indicate this treatment, but which do not, and they had, therefore, better be mentioned. They are:

"**Pulmonary Hæmorrhage.**—It is now known that this, so far from being a contra-indication to treatment by high altitudes, is actually relieved by it. The exact explanation cannot be given."

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[1] A Text-book of General Therapeutics. Macmillan & Co., London, 1889.

With this the author of this book cannot agree.

"**Fever.**—If this is not excessive, and if it does not indicate any active changes in the lungs, it is often improved.

"**Simple Diarrhœa and Simple Dyspepsia.**—These are both benefited.

"**Night-sweats.**—There is a common belief that these forbid this treatment; on the contrary, they often disappear on removal to a high altitude.

"**The presence of Cavities.**—This is not a contra-indication, unless a very large area of lung is destroyed.

"There is no need, after these two lists, to say what cases are suitable for this climatic treatment; it may, however, be observed that those in which there is threatened phthisis, with a strong hereditary predisposition, and those of imperfect thoracic development, are much benefited. According to most authorities, it cannot be too strongly urged that, so long as the condition and disease of the patient allow the reverse indications to be neglected, a mountain climate should be tried."

To these rules the author would add the following invariable rule, viz., Do not send a case away to die. If the disease is so far advanced that no good can be derived from a trip abroad, it is cruel to make a wretched patient exhaust his strength, his money, and his happiness by seeking health which it is impossible for him to obtain. A patient of the writer's returned on one occasion from a stay of a few days at a noted Southern resort for consumptives, and, when reprimanded for his imprudence, replied: "Doctor, I would rather be at home, and die at once, than drag out a few more years surrounded by a crowd of coughing, hawking, and wasting consumptives." This reply evidences clearly the necessity of avoiding "consumptive resorts" as much as possible in these cases, and in directing the mind of the patient from depressing thoughts and his own ailment.

The medicinal measures to be carried out in all cases of phthisis, except that known as the galloping form, are not numerous if we confine ourselves to the modes possessing any real value. For many years cod-liver oil has been sadly abused in the management of these cases and has been given at all stages, out of ignorance as a general rule. The writer believes that the following rules are never to be departed from:

1. *Never use cod-liver oil where the disease has passed the primary stages of thickening of the lung and roughening of the respiratory sounds, unless fibroid changes go on, and the changes are very slow indeed.*

2. *The use of cod-liver oil when rapid degenerative changes are occurring in the lung is distinctly harmful, as it is not of any service, disorders the digestion and destroys the appetite.*

When the oil is used it should be given as directed in the article on Cod-liver Oil.

A remedy of equal value as a curative and of great value as a palliative is creasote, first introduced by Bouchard some thirteen years ago, but only recently widely employed. Many cures have been claimed from its use in the early stages of phthisis and it has been highly lauded by a number of European clinicians. In the author's experience it is merely a palliative to the cough and general discomfort, at least after the disease is really established, and the opinion expressed by Strümpel expresses so well the thought which the author was about to write when he read Strümpel's article that his words are here given: "Taking it all in all, we find that creasote, even in large doses, has no injurious effect in tuberculosis. At times we notice an apparently favorable symptomatic effect. We failed, however, to observe any real influence excited by creasote in the progress of the disease."

When creasote is used internally it is best to be given in the following formula:

℞.—Creasote (beechwood)		gtt. xxxij. to f℥j.
Tr. gentian		fʒj.
Alcohol		f℥j.
Tokay or Malaga wine	q. s.	f℥iv.

M.—S. Teaspoonful in water, or wine, three times a day.

Often a 1 drop dose three times a day may be increased to 5 drops in the same period with advantage, by using a little more of the mixture each time it is taken. Sometimes 1 or 2 drops in capsules are as useful as the formula just named.

Creasote may also be inhaled in the spray from a steam atomizer or by means of an inspirator fitted over the nose and mouth and made of perforated zinc with a sponge at the edge to hold the drug. A very good inhalation is to wet the sponge with creasote, alcohol and water, each one-half, or to use the creosote alone if coughing is not too severe. These inhalers are very cheap, not easily broken, and readily worn.[1]

If the cough in phthisis is excessive, a little spirit of chloroform placed on the sponge of the inhaler will often relieve it, or a mixture of morphine and wild cherry bark may be used as follows:

℞.—Morphinæ sulph.	gr. j to ij.
Syr. pruni Virg.	f℥ij.

M.—S. Teaspoonful every three hours.

Or the following:

℞.—Potas. cyanidi	gr. j. to ij.
Morph. sulph.	gr. j. to ij.
Syr. pruni Virg.	f℥iij.

M.—S. Teaspoonful every four hours.

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[1] These may be obtained from H. K. Mulford & Co., of Philadelphia.

Very often during the course of phthisis localized spots of pleuritic inflammation arises. Without any cause the patient will remark "Doctor, I think I have taken a little more cold and I have a stitch here in the chest." The best treatment is to apply a small blister or to paint the spot with iodine. (For the treatment of Hæmoptysis, see p. 458.)

When the night-sweats are very violent hypodermic injections of atropine in the dose of $\frac{1}{60}$ to $\frac{1}{50}$ grain are useful in some cases, and the efficiency of this treatment may be increased by the use of an alum sponge-bath at bedtime. A solution of alum 10 to 20 grains to the ounce may be sponged over the body, or sulphuric acid may be added to water in the proportion of 1 drachm to the pint, and used in a similar way to the alum solution with a sponge.

Sulphuric acid is often given internally in these cases with advantage. Sometimes minute amounts of pilocarpine are of service.

Small doses of pilocarpine amounting to $\frac{1}{20}$ grain, given from one to two hours before the sweat is expected, are potent for good. The means by which this result is brought about are not hard to seek. The drug in any dose causes great stimulation of the peripheral ends of the nerves supplying the sweat-glands. In many instances we find excessive secretion dependent upon depression of function, as in a serous diarrhœa or a local sweating of the feet. These states pass away just as soon as the parts regain their normal tone through proper treatment. The night-sweats of phthisis are improved by pilocarpine because this drug in all doses stimulates the sweat-glands. In large doses this stimulation amounts to free diaphoresis; but in the minute doses such as we name, the stimulation just balances the depression, and a normal tone is acquired. While it is true that pilocarpine and atropine are physiological antagonists, it will be found practically beneficial to prescribe small doses of both in such cases as refuse to respond to either one alone, as by their antagonism they prevent over-action on other parts of the body, and both act in harmony in so influencing the sweat-glands as to be of service to the patient.

TYPHOID FEVER.

The attempt to review the treatment of the disease known as typhoid fever would be absolutely impossible, owing to the very numerous theories and practices put forward by various clinicians. What is said under the general heading of Fever (see page 424), and under the consideration of antipyrine and acetanilide, gives a sufficient indication as to the treatment of the febrile movements, and the care of the patient beyond this point is in nearly all cases identical.

Before going further, however, the writer desires to insist very strongly upon this fact, namely, that a case of typhoid fever is not curable in any degree. No remedy yet found, except through the prevention of complications, has shortened its course. We can only guide the patient safely to health when the storm of disease comes on, and cannot stop the storm.

Not only should the facts of the last paragraph be carefully borne in mind, but the physician must remember that he is treating an exhausting disease. Not a disease which runs a violent course for a few days and strands the patient sick and weak, but convalescent, upon the shores of health, but one in which, after sapping his strength for weeks, some sudden incurrent malady or accident may ensue which will speedily kill him if every possible grain of strength is not preserved for the struggle. The physician should always put every case in which there is a suspicion of typhoid fever to bed at once and keep him there till the disease has passed or fails to appear. Every muscular movement made unnecessarily is a waste of force, and, in consequence a bed-pan should always be employed, the patient not being allowed to sit erect upon a commode. Remembering, too, the force consumed in difficult digestion, the food should be liquid, free from fat, consist solely, if not entirely, of milk, and during convalescence, of an egg or a little arrowroot or corn-starch. Not only is this recommendation practically correct at the bed-side, but it is well based on scientific fact, for Brieger has shown that typhoid bacilli do not readily reproduce themselves and their poisons in peptone and well-digested milk, but do so very actively in meat broths or jelly which has not been converted by the digestive juices. He has also found that these bacilli generate two poisons, one of which causes, when given to animals, salivation, paralysis, and diarrhœa, the other, violent and exhausting diarrhœa alone. Milk diet is, therefore, evidently better than broth diet in typhoid fever, and we once more are able to explain an empirical discovery by a scientific research. Another reason for using liquid foods instead of solids, beyond the difficulty of digestion, is the fact that the solids may irritate or perforate the ulcers in the small intestine.

Alcohol is to be used in all stages as a stimulant, a giver of force to the system, and as an aid to digestion. A very large part of the profession believes that the mere presence of an abnormally high temperature contra-indicates the use of alcohol. Mere high temperature does not do so, however, and it seems probable that many deaths have resulted from putting into practice such a belief.

High temperature of a sthenic type, with a full, tense, bounding pulse, and all signs of a disease attacking one in the full vigor of life, of course precludes its use; but in the high temperature of advanced typhoid, with the marked asthenia often present in that stage, alcohol should be given constantly in large amount. Under these circumstances the tissues which the man can afford to lose are gone, and much of the vital portion of his system is greatly encroached upon; the alcohol yields force to the body, is then burnt up to a great degree, and keeps the flagging heart pumping the tides of blood through the lungs and systemic circulation, when otherwise the very cardiac depression would produce hypostatic congestion, if not more widespread pulmonary consolidation.

A no less useful and valuable result obtained by the use of alcohol in the early stages of exhaustive fevers is the part that it plays in aiding digestion. The writer has already, in another paper, defined the difference between the influence of alcohol in the artificial digestion of the test-tube and that occurring in the stomach. No one doubts that alcohol added to a small amount of gastric juice in the test-tube, retards or prevents its action; but evidence is abundant to prove that the ingestion of this drug into the stomach produces a very decided increase in the quantity of gastric juice secreted over and above that normally present, by its stimulating and irritant action. Aside from experimental evidence, every-day experience has taught the *gourmand* that alcohol, in a fairly concentrated form, enables him to digest an amount of food which under ordinary circumstances would remain unchanged in his stomach.

Alcohol should, therefore, be used all through the ordinary exhausting fevers, for the purpose, in the first stage, of aiding digestion, and, in the later stages, of supporting the system.

The importance of aiding the flagging powers of the stomach is not generally recognized; but if one remembers the fact that, at one time during the course of a severe attack of typhoid, an occasion must come when a struggle between the few remaining grains of strength and the disease results on one hand in death or in recovery, its importance becomes evident. By the ingestion and digestion of more food early in the attack, a larger amount of vital force remains for use at the crisis, and the chances of a recovery, to say the least, are increased.

In those cases with a temporary loss of heart power due to hæmorrhage or some sudden severe depression, alcohol is, above all others, the remedy to be employed, hot and concentrated. The same conditions make it, with ammonia, a most useful remedy in snake-bite; where the fugacious action of the ammonia is followed by the more permanent stimulation of the alcohol.

That alcohol may be misused and cause great harm, is of course known to every practitioner of medicine. So long as it reduces the temperature and lowers the rate of the pulse, causes a moistened skin and tongue, and quiets nervous twitchings, it does good, and only up to this point is it to be employed. If its administration is pushed after this, the tendency to adynamia becomes under the overuse of the drug, one of dynamia; the pulse no longer soft, but in angry, bounding beats; the nervous symptoms change from low, weak, muttering delirium, with subsultus tendinum, to wild, incoherent callings and strong tossings to and fro; and by and by, when the influence of the alcohol begins to cease, and even before this time, the system has put forth the strength of days in a few hours, and the man is dead.

The treatment used by the author in his wards at the St. Agnes Hospital give him results which the application of other methods failed to give, and is as follows:

As soon as the patient enters the house he is washed or bathed and placed in bed and required to remain there. He is assured that the more quietly he lies the more mild and safe will be the course of his attack, and is made to use a bed-pan or urinal and never allowed to get up. He is also given five drops of dilute hydrochloric acid every four hours, or if the bowels are not active, nitro-muriatic acid is substituted therefor, care being taken to employ one, two, or three drops of the strong, freshly mixed red acid, according to the degree of coating of the tongue. The diet is strictly a milk diet, namely, a quart to a quart and a half a day with a little salt to flavor it, as already described in the article on Indigestion. Sometimes, if vomiting is threatened, half lime-water is added or the milk is peptonized.

For the dry and sordes-covered tongue, a mouth-wash of glycerin and water, half and half, to which may be added a little lemon-juice, is used. If constipation is very obstinate and continues over two days an injection is employed, and if this, after being used twice, fails to act, a dose of calomel $\frac{1}{6}$ grain every fifteen minutes, till a grain has been taken, is prescribed, and followed by half an ounce of sulphate of magnesia, if no movement occurs in twelve hours.

When diarrhœa becomes troublesome, over four or five passages a day, the following will be found of service:

℞.—Acid. sulph. aromat.	fʒij.
Ext. hæmatoxylon	ʒiij.
Syr. zingiberis	f℥iij.

M.—S. Teaspoonful every hour until relieved.

Just so soon as any evidences of tympanites or much meteorism come on, turpentine is given as follows:

℞.—Ol. terebinthinæ	f℥ij.
Syr. acaciæ . . . . q. s.	f℥iij.

M.—S. Teaspoonful t. d.

At the same time it is well to employ a turpentine stupe over the abdomen (see page 288). Where the tympanites is excessive it may be relieved by an injection made up as follows:

℞.—Olei terebinthinæ	f℥j to ij.
Ol. olivæ	f℥iv.
Mist. asafœtidæ	Oj.

M.—S. Use as an injection.

In the latter stages of typhoid fever, as convalescence is approached, turpentine is invaluable, as it causes rapid healing of the ulcers and stops diarrhœa, as well as prevents relapses through the absorption of poisonous materials from the unhealed intestinal lesions.

For many days after the patient begs hard for more solid food it should not be allowed, for he will ask for it long before he should have it.

The complications of typhoid fever of the most serious import are hæmorrhage from the bowel, pneumonia and pleurisy, and perforation of the gut.

The hæmorrhage from the bowel may be treated as indicated under that heading, on page 459, and the pneumonia or pleurisy be treated as are those diseases when free from complications (see pages 508 and 509); *but* it is to be remembered that this is an *asthenic* or *adynamic case* which must not be *bled* or *depressed*, *but stimulated*. When perforation of the intestine appears, large doses of morphine should be given to relieve pain, put aside collapse, and allay irritation. Warm applications should be used over the belly and down the limbs, and stimulants given, if needed in those cases.

Probably, in the future, surgery will add another triumph to the art by devising some fairly safe plan of operative interference for this state, which, if left alone, is almost always fatal.

VOMITING.

Vomiting is, of course, a symptom, not a disease, and arises from a large number of causes, some of which are very unimportant, others very serious. The most common cause is probably lack of proper digestion, with all that name implies—that is, gastro-intestinal irritation and perversion of normal function. Additional causes are cerebral hæmorrhage, tubercular meningitis, cerebritis, or uræmia, which irritates the vomiting centre, or diseases of the middle lobe of the cerebellum, or vertigo, which is probably largely dependent upon disease of this lobe or the nerve-fibres going to it.

These may all be considered as lesions of centric character which directly or indirectly cause the vomiting centre to send out impulses. On the other hand, it is worthy of note that, under certain circumstances, vomiting may be reflex and dependent upon irritation of the nerves of the stomach or elsewhere, which convey impulses to the muscles whose activity results in vomiting. These considerations are well represented by the vomiting which comes on in incarcerated hernia, or in pregnancy, or in that occurring during the passage of renal or hepatic calculi, or in indigestion. The first variety named is centric, the second reflex or peripheral.

It is important to bear in mind that peripheral vomiting due to irritability of the gastric walls may be dependent upon two conditions. The mucous membrane and its nerves may be over-excitable, or they may be depressed. For this reason we shall find two modes of treatment are necessary when this subject is considered below.

The mechanism of vomiting consists in the closure of the pyloric sphincter, the contraction of the gastric muscles from the pylorus to the cardia, and at the same time, and more important, the contraction of the supplementary respiratory and abdominal muscles so compress the stomach as to drive out its contents through the open œsophagus. The violence of the muscular contractions in the abdominal walls is greater where the stomach is partly empty, and gives rise to that pain and exhaustion accompanying the conditiion known as retching. The practical point to be learned from this is that vomiting is always easier when the stomach is full; so, if an emetic is given, a large amount of liquid should at once follow it, if possible. Dogs vomit easily because of the development of the gastric muscles, but they make it easier yet by filling the stomach with air by swallowing first, and so completely fill the viscus that its walls can contract on a resisting mass.

Having described the mode and causes of vomiting, it still remains to consider its treatment.

It is needless to remark that the vomiting of cerebral disease is very intractable, and that very active agents must be used to put it aside. It is probable that the vomiting following etherization is centric, and should be treated as should all forms of obstinate emesis, by the injection into the rectum of 40 grains of sodium or potassium bromide and 20 drops of laudanum in half a pint of water.

By this means the vomiting ceases; and, if it does not, may be made to do so, unless the cause is very serious, by a second injection one hour after the first.

When vomiting seems to be due to hyper-excitability of the gastric mucous membrane, so that when very small amounts of food are swallowed they are at once rejected, local anæsthetics and depressants are needed, the chief of these being cocaine and aconite.

Both of these drugs have disadvantages, because in effective dose their general physiological action may be very severe and almost poison the patient. When given to act as anti-emetics, these drugs do so by acting as local anæsthetics by paralyzing the peripheral sensory nerves. Cocaine should be given in the dose of 2 to 3 drops, in water, of a 4 per cent. solution every fifteen minutes until ten drops are taken. The aconite should be used in the form of the tincture, the patient being placed flat on the back, so as to withstand the ensuing cardiac depression with the least inconvenience, and 2 to 5 drops of the drug given in a little water every thirty minutes till the rapidly weakening pulse forbids its further use. This may be resorted to in all forms of vomiting due to irritability of the stomach, but is contra-indicated in cases of debility or weakness. Aconite is generally to be preferred to cocaine.

Sometimes a prescription of the following character is of service, the bismuth acting as a coating to the walls of the stomach and protecting them:

℞.—Bismuth. subnitrat.	ʒij.
Tr. aconit.	gr. xx to xxx.

M.—Ft. in chart No. x. S. One powder every half hour.

This prescription is very useful if the vomiting be due to acidity of fermentation and becomes excessive.

In other cases of the same type the following is useful and may be preferred, if, owing to active fermentation, the vomiting is excessive (the creasote or carbolic acid being a local anæsthetic and antiseptic):

℞.—Acid. carbolic. or creasote (Beechwood)	gtt. x to xx.
Bismuth. subnit.	ʒij.

M.—Ft. in chart No. x. S. One powder every hour.

Sometimes pure chloroform in 1 or 2 drop doses, in a little water, does good; and dilute hydrocyanic acid, in the dose of 2 to 6 drops, is also of value in like instances, given in a tablespoonful of water.

The care of a case of vomiting dependent rather upon depression and debility of the stomach than upon irritation, is directed to the administration of gastric and it may be systemic stimulants. The chief one of these is ipecac in small doses, and it is this instance of using a drug generally resorted to for the production of emesis by physicians, which has caused homœopaths to claim that we practise the law of *similia similibus curantur* and infinitestimal doses. The claim only holds good on its face, for we do not use an infinitesimal dose, and while obeying no attempt at a law use common sense. Ipecac is an irritant, even to the skin, and it is partly by its irritant effects that it causes vomiting by exciting the stomach to a point over and above its normal condition. In vomiting depending upon gastric debility and depression small doses of ipecac do good, because they irritate the stomach sufficiently to restore its normal tone without going to the other extreme of hyper-excitation. Under these circumstances drop doses of the wine of ipecac or ¼ of a grain of the powdered ipecac every hour is of the greatest value, succeeding after all remedies have failed.

In other instances tincture of nux vomica, given in ½ to 1 drop doses, is useful, as follows:

℞.—Tr. nuc. vom.	gtt. iv to viij.
Aq. cinnamom.	f℥j.

M.—S. Teaspoonful every half hour or hour.

In the nausea and vomiting following an alcoholic debauch ½ to 1 drop of Fowler's solution every two hours, or before food, is often capable of giving relief, and it may be used in other cases in place of the nux vomica and ipecac. Another useful measure in alcoholic nausea is the use of full doses of hydrochloric acid, 5, 10, or 15 drops of the dilute acid in half a tumblerful of water, repeated every two hours.

In all cases of vomiting counter-irritation should be applied over the stomach in the form of a mustard plaster, or, if preferred, an ice-bag may be applied to the nape of the neck, the lumbar spine, or the epigastrium.

The food given in cases of vomiting should be especially prepared. It is best always to use peptonized milk made by using the peptonizing materials sold by all the large drug firms of reliability. (See article on Diet, p. 328.) Lime-water should always be put in the milk if it is not peptonized; the proportions usually employed are perfectly useless because of their smallness—at least 2 or 3 tablespoonfuls should be placed in each glass of milk.

Another point of importance is the quantity of liquid taken. As fast as the patient vomits he is often fed by well-meaning friends with glasses full of liquid. Properly he should have only 1 or 2 teaspoonfuls of milk every hour, half hour, or fifteen minutes, if the stomach will contain it, for it is better for him to retain a drachm than to take a quart and vomit it.

Where vomiting is absolutely incoercible, enemata previously partly digested must be resorted to.

WHOOPING-COUGH.

The remedies recommended for this disease are almost as numerous as the members of the medical profession, and every one of them is worthless in so far as a cure is concerned. Probably the very best drug of all in the majority of cases is antipyrine. Given in the dose of ½ to 3 grains every five hours according to the age of the child it will nearly always decrease the number of paroxysms but not necessarily the severity of each individual attack.

Where the child will submit to it there is little doubt that quinine in a very fine spray will be of service in many cases, and it is very useful, when so used, as a prophylatic in other children of the same family who it is feared will be attacked by the same disease. The strength of the solution to be employed should be about 1 grain to the ounce of water.

A very useful remedy in some cases is belladonna in the form of the tincture, in the dose of ½ drop twice a day to a child one or two years. Where great vascular engorgement ensues upon a severe coughing spell, vascular sedatives are of service. That is, in those cases in which hæmorrhages from the nose, ears and mouth take place veratrum viride or aconite may be used. The reason of this lies in the following facts: The vascular tension consequent upon the obstruction of respiration causes a rise of blood pressure from asphyxia, and the hæmorrhage or the conjunctival ecchymoses named are due to rupture of the small bloodvessels under the strain. By lowering vascular tension we prevent so great a spasm of the bloodvessels and avoid vascular rupture or distention.

Where paroxysms come on so rapidly as really to interfere seriously with respiration a whiff of chloroform poured over the parent's hand may relax the spasm and in other instances nitrite of amyl is equally serviceable and more safe.

The vomiting following the cough may be overcome by using such minute amounts of milk as to enable nutrition to go on without at any time overloading the stomach, as, for example, a teaspoonful after each paroxysm of cough.

WORMS.

Intestinal parasites are commonly represented by the Ascaris Lumbricoides, or round-worm; Tænia Solium, Tænia Media Canellata; and the Bothriocephalus Latus or tape-worms; and finally, by the Oxyuris Vermicularis, sometimes called seat-, pin-, or thread-worms.

The round-worm and tape-worm are to be attacked by way of the patient's mouth, the seat-worms by the anal opening, ; and before mentioning the drugs to be employed it is necessary to insist upon one or two important points, disregard of which will result in failure in treatment.

Whenever a round- or tape-worm is to be attacked the patient must be starved for at least twelve to twenty-four hours, in order that no food in the intestinal tract may protect the worm from the action of the drug. During this time a little milk may be taken, and after a night of fasting, before breakfast, the anthelmintic must be swallowed. Further than this, nearly all of these drugs must be followed by purges in order to dislodge the intruder while he is paralyzed and has lost his hold, and in many instances it is well to have a basin of salt and water ready so that when a passage occurs an injection may follow and wash out any remaining segments of the worm which may remain behind in the rectum.

In the treatment of thread-worms it is necessary to wash out the bowel thoroughly with soap and water to dislodge the fæcal matter and expose the worms in the folds of the mucous membrane.

The drugs which are used against the round-worm are: spigelia in the form of the fluid extract, dose 1 drachm to a child of two or three years, or 2 drachms to an adult; or better still, the fluid extract of spigelia and senna, dose 2 to 3 drachms, given in divided does to a child. Oil of chenopodium, dose 5 to 20 drops on sugar. Santonin, dose ¼ to ½ grain to a child in the form of troche, *made by using the crystals*, or as much as 2 to 4 grains to an adult. (See Santonin.)

Brayera, or kooso, is given also for the same worm in the form of the infusion, made by adding ½ ounce of the powdered leaves to 1 pint of water and mucilage of acacia, half and half of each, and drinking the mixture, or in the form of the fluid extract, in the dose of ½ ounce to an adult. Koosin may be given in 40 grain doses in capsule to adults, but it should not be used against worms in pregnant women, as it may cause abortion.

Unless the spigelia is used with senna it should always be followed after two or four hours by a full dose of castor oil or a saline purgative to sweep out the worm, and the same rule holds true of all the other drugs mentioned above.

The most efficient remedy against the tape-worm is pelletierine, the active principle of pomegranate, dose 20 grains in capsules; or pepo or pumpkin seed (2 ounces) may be resorted to when deprived of their outer coating and rubbed into a paste with sugar. Almost, if not quite as valuable a remedy is male fern, or *filix mas*, or as it is officinally called, *Aspidium*. Used in the form of the oleoresin (*Oleoresina Aspidii*) in the dose of ½ to 1 drachm to an adult, it should be followed in three or four hours by a calomel purge, aided by a saline. The calomel or the bile which is present is peculiarly abhorrent apparently to the tape-worm, and its free secretion should follow all the drugs just named.

By far the most useful remedy for seat-worms is quassia by injection. One to two ounces of powdered quassia or quassia chips may be made into a decoction with a pint of water, and half of this injected into the rectum after it is well cleansed with soap and water. The quassia injection should be held for some minutes, and in children this may be accomplished by pressing upon the anal opening a towel covering the ball of the thumb. If this fails to bring away all the worms in three or four trials, either there are none present or the bowel is not washed properly.

TABLE OF DOSES OF REMEDIES.

Remedies.	Dose.
Abstract. aconiti	¼ to ½ g.
aspidospermæ	5 " 20 "
belladonnæ	½ " 1½ "
cannab. ind.	1 " 3 "
conii	1 " 2 "
digitalis	1 " 3 "
gelsemii	1 " 3 "
hyoscyami	2 " 5 "
ignatiæ	1 " 3 "
ipecac	3 " 30 "
jalapæ	6 " 10 "
nuc. vom.	¼ " ½ "
phytolaccæ	5 " 15 "
pilocarpi	6 " 30 "
podophylii	4 " 10 "
senegæ	4 " 10 "
valerianæ	10 " 15 "
veratr. vir.	1 " 3 "
Acetphenetidine	1 " 2 "
Acet. lobeliæ	15 " 30 m.
opii	5 " 16 "
sanguinar.	15 " 30 "
scillæ	10 " 30 "
Acid. acet. dil.	60 " 90 "
arsenious	1/64 " 1/20 g.
benzoic	5 " 15 "
boric	5 " 10 "
carbolic	1 " 3 "
gallic	3 " 15 "
gall. in albuminuria	10 " 60 "
hydrobrom. (34 p.c.)	10 " 15 "
hydrobrom. dil.	40 m. to 2 fl. d.
hydrochlor.	3 " 10 m.
hydrochlor. dil.	10 " 30 "
hydrocyan. dil.	2 " 6 "
lactic	15 " 60 g.
nitr.	3 " 10 m.
nitr. dil.	10 " 30 "
nitro-hydrochlor.	3 " 10 "
nitro-hydrochlor. dil.	5 " 20 "
Acid. phosphoric (50 per cent.)	3 " 15 g.
phosphoric dil.	10 " 30 m.
salicylic	5 " 20 g.
sulphuric	5 " 10 m.
sulphuric dil.	5 " 30 "
sulphuric arom.	5 " 10 "
sulphurous	30 " 60 "
tannic	2 " 10 g.

Remedies,	Dose.
Aconitina (white crystals)	1/400 to 1/200 g.
Adonidin	— 1/8 "
Agaricin	1 " 4 "
Aloe	2 " 5 "
Aloinum	1 " 3 "
Alumen	10 " 15 "
Ammonii benzoas	10 " 20 "
bromid.	5 " 30 "
carb.	3 " 10 "
chlorid.	10 " 30 "
iodid.	3 " 15 "
phosph.	5 " 20 "
picras.	¼ " ½ "
sulph.	8 " 15 "
valer.	3 " 15 "
Amyl nitris	2 " 5 m.
Amylum iodatum	3 " 30 g.
Antifebrin	— 8 "
Antimonii et pot. tartr.; diaph.	1/20 " 1/12 "
et. pot. tartr.; emetic	1 " 2 "
oxid.	1½ " 2 "
oxysulphuret	½ " 2 "
sulphid.	½ " 2 "
sulphuret.	½ " 2 "
Antipyrin	— " 20 "
Apiol	3 " 5 "
Apomorph. hydrochlor.	1/30 " 1/10 "
Aqua ammoniæ	6 " 30 m.
Aqua amygd. amar.	2 " 4 fl. d.
camphoræ.	½ " 2 fl. oz.
chlori.	1 " 4 fl. d.
creasoti	1 " 4 "
laurocerasi	6 " 30 m.
Arbutin	5 " 15 g.
Argenti iodidum.	½ " 2 "
nitras	1/6 " 1/3 "
oxid.	½ " 2 "
Arsenii iodidum	1/64 " 1/10 "
Assafœtida	5 " 20 "
Atropina	1/128 " 1/32 "
Atropinæ sulph.	1/128 " 1/32 "
Auri et sodii chlorid.	1/32 " 1/16 "
Balsamum gurjunæ	20 " 30 m.
Belladonnæ fol.	1 " 10 g.
Belladonna rad.	1 " 5 "
Benzanilide	1 " 6 "

REMEDIES.	DOSE.
Berberinæ sulph. .	3 to 10 g.
Berberina and its salts	3 " 15 "
Bismuthi citras. . .	3 " 15 "
et ammon. citr. . .	1 " 15 "
subcarb.	6 " 30 "
subnitr.	30 " 60 "
tannas.	6 " 30 "
valer.	1 " 3 "
Brayera	2 " 6 d.
Brucina	$\frac{1}{64}$ " $\frac{1}{16}$ g.
Caffeina	1 " 5 "
Caffeinæ citras. . .	1 " 5 "
Calcii bromidum . .	5 " 30 "
carb	15 " 60 "
hypophosphis . .	3 " 15 "
iodidum	1 " 3 "
Calcii phosphas. . .	15 " 30 "
Calx chloridum . .	10 " 20 "
Calx sulphurata . .	$\frac{1}{3}$ " 1 "
Camphora	3 " 10 "
Camph. monobrom .	2 " 5 "
Cantharis	$\frac{1}{2}$ " 2 "
Capsicum	1 " 3 "
Castoreum	6 " 15 "
Catechu	15 " 30 "
Cerii nitras	1 " 3 "
oxalas	1 " 3 "
Chinoidinum . . .	3 " 30 "
Chinoline	5 " 10 "
Chloral	3 " 20 "
Chloroformum. . .	1 " 5 m.
Chrysarobinum . .	8 " 15 g.
Cinchona	15 " 60 "
Cinchonidina, and its salts.	1 " 30 "
Cinchonina, and its salts.	1 " 30 "
Cinnamomum. . .	6 " 30 "
Cocaine	1 " 4 p. c. sol.
Cocæ fol.	1 " 3 "
Codeina	$\frac{1}{2}$ " 2 g.
Colchicin	$\frac{1}{100}$ " $\frac{1}{60}$ "
Colocynthin . . .	$\frac{1}{6}$ " 2 "
Confectio sennæ . .	1 " 2 "
Coniina, and its salts	$\frac{1}{64}$ " $\frac{1}{32}$ "
Convallamarine . .	$\frac{1}{2}$ " 4 "
Copaiba	15 " 60 m.
Cota	1 " 2 g.
Cotoina	$\frac{1}{6}$ " $\frac{1}{2}$ "
Creasotum	1 " 3 m.
Creta præpar. . . .	15 " 75 g.
Croton chloral. . .	1 " 5 "
Cubeba	15 " 60 "
Cupri acetas . . .	— $\frac{1}{2}$ g.
sulphas	$\frac{1}{4}$ " $\frac{1}{2}$ "
Cupri am.	$\frac{1}{6}$ " 1 "
Curare	$\frac{1}{32}$ " $\frac{1}{6}$ "
Curarina	$\frac{1}{64}$ " $\frac{1}{20}$ "
Daturine	$\frac{1}{100}$ " $\frac{1}{30}$ "
Decoct. aloes comp. .	$\frac{1}{2}$ " 2 fl. oz.

REMEDIES.	DOSE.
Decoct. sarsap. comp.	2 to 6 fl. oz.
Digitalinum . . .	$\frac{1}{64}$ " $\frac{1}{32}$ g.
Digitalis	$\frac{1}{2}$ " 2 "
Duboisina, and its salts.	$\frac{1}{128}$ " $\frac{1}{60}$ "
Elaterinum ; U. S. P., 1880	$\frac{1}{60}$ " $\frac{1}{12}$ "
Elaterinum ; U. S. P., 1870	$\frac{1}{10}$ " $\frac{1}{6}$ "
Emetina, and salts, emetic	$\frac{1}{8}$ " $\frac{1}{4}$ "
and salts, diaph. .	$\frac{1}{120}$ " $\frac{1}{30}$ "
Emulsio hydrocyan.	$\frac{1}{2}$ " 1 fl. d.
Ergota	15 " 60 g.
Ergotinum	2 " 8 "
Eserina, and its salts	$\frac{1}{64}$ " $\frac{1}{20}$ "
Extr. aconiti fol. fluid	1 " 5 m.
aconiti rad.; U.S.P., 1880	$\frac{1}{12}$ " $\frac{1}{4}$ g.
aconiti [rad.] fluid	$\frac{1}{2}$ " $2\frac{1}{2}$ m.
aconiti fol. (Eng.) .	$\frac{1}{3}$ " $\frac{1}{2}$ g.
aconiti fol.; U.S.P., 1870	$\frac{1}{3}$ " $\frac{1}{2}$ "
aletridis fl. . . .	15 " 30 "
alni rubræ fl. . .	15 " 30 "
aloes aquos . . .	$\frac{1}{2}$ " 3 g.
alston. constr. fl. .	1 " 4 fl. d.
angelicæ rad. fl. .	30 " 60 m.
angusturæ fl. . .	15 " 45 "
anthemidis . . .	2 " 10 g.
anthemidis fl. . .	30 " 60 m.
apocyni andros fl. .	8 " 50 "
apocyni cannab. fl.	8 " 30 "
araliæ hisp. fl. . .	30 " 60 "
araliæ nudic. fl. .	30 " 60 "
araliæ racem. fl. .	30 " 60 "
araliæ spin. fl. . .	30 " 60 "
arecæ fl.	45 " 75 "
arnicæ flor. . . .	3 " 8 g.
arnicæ fl.	5 " 15 m.
arnicæ rad. . . .	2 " 5 g.
arnicæ rad. fl. . .	5 " 15 m.
aromat. fl. . . .	30 " 60 "
ari triphylli fl. . .	15 " 30 "
asari fl.	15 " 30 "
asclep. incarn. fl. .	15 " 30 "
asclep. syr. fl. . .	15 " 30 "
asclep. tuber. fl. .	15 " 30 "
aspidii fl.	1 " 4 fl. d
aspidospermæ fl. .	15 " 45 m.
auranti cort. fl. .	$\frac{1}{4}$ " $2\frac{1}{2}$ fl. d.
azedarach fl. . .	15 " 75 m.
baptisiæ fl. . . .	7 " 30 "
bellad. alcohol. .	$\frac{1}{6}$ " $\frac{1}{2}$ g.
bellad. fol. (Eng.) .	$\frac{1}{6}$ " $\frac{2}{3}$ "
bellad. fol. fl. . .	3 " 6 m.
bellad. rad. . . .	$\frac{1}{8}$ " $\frac{1}{4}$ g.
bellad. rad. fl. . .	1 " 3 m.
berber. aquifol. fl. .	15 " 30 "
berber. vulg. fl. .	15 " 30 "

REMEDIES	DOSE.
Extr. boldi fl.	3 to 15 m.
brayeræ fl.	2 " 4 fl. d.
bryoniæ fl.	15 " 60 m.
buchu fl.	½ " 2½ fl. d.
calami fl.	15 " 60 m.
calend. fl..	15 " 60 "
calumbæ.	8 " 10 g.
calumbæ fl.	15 " 60 m.
canellæ fl.	15 " 60 "
cannab. Amer. fl	3 " 15 "
cannab. ind.	⅙ " ½ g.
cannab. ind. fl..	3 " 6 m.
capsici fl.	1 " 8 "
cardam comp. fl.	15 " 45 "
cardui bened. fl.	15 " 60 "
carnis	15 " 60 g.
cascara sagrad fl	10 " 20 m.
cascarillæ fl	¾ " 2½ fl. d.
castaneæ fl	¾ " 2½ "
catariæ fl	¼ " 1¼ "
catechu liquid	8 " 30 m.
caulophylli fl	15 " 30 "
chelidonii fl	15 " 30 "
chelonis fl	30 " 60 "
chimaph. fl	¾ " 1¼ fl. d.
chionanthi fl	¾ " 2½ "
chirettæ fl	½ " 1¼ "
cimicifugæ fl	8 " 30 m.
cinchoniæ	15 " 30 g.
cinchoniæ fl	30 " 60 m.
cinchoniæ arom. fl.	30 " 60 "
cinchoniæ comp. fl.	½ " 1¼ fl. d.
cocæ	1 " 2 d.
cocculi fl.	1 " 3 m.
colch. rad.	⅓ " 1½ g.
colch. rad. fl.	2 " 4 m.
colch. sem. fl.	1½ " 6 "
collinsoniæ fl.	30 " 60 "
colocynth	1½ " 5 g.
colocynth comp.	1½ " 5 "
condurango fl	8 " 30 m.
conii fol. (Eng.)	1 " 4 g.
conii fol. alc.; U.S. P., 1870	1 " ½ "
conii [fr.] alc.; U. S. P., 1880	⅓ " 1 "
conii fol. fl.	1 " 2 m.
conii [fr.] fl.; U. S. P., 1880	1½ " 5 "
convallariæ rad. fl.	15 " 30 "
coptidis fl.	30 " 60 m.
corn. flor. fl..	30 " 60 "
corydalis fl.	15 " 30 "
coto fl.	3 " 15 "
cubebæ fl.	15 " 30 "
cypripedii fl.	15 " 60 "
damianæ fl.	½ " 2½ fl. d.
delphinii fl.	1 " 3 m.
digitalis	⅙ " ½ g.
digitalis fl.	1 " 6 m.
Extr. dioscoreæ fl.	15 to 30 m.
ditæ fl.	1 " 4 fl. d.
dracontii fl.	30 " 60 g.
droseræ fl.	5 " 10 m.
dulcamaræ	5 " 15 g.
dulcamaræ fl.	1 " 2 fl. d.
ergotæ	1½ " 8 g.
ergotæ fl..	15 " 60 m.
eryodictyi fl.	15 " 30 "
erythroxyli fl.	½ " 2 fl. d.
eucalypti fl.	15 " 60 m.
euonymi fl.	15 " 60 "
eupatorii fl.	30 " 60 "
euphorb. ipec. fl.	5 " 30 "
ferri pom.	3 " 15 g.
frangulæ fl.	½ " 2½ fl. d.
frankeniæ fl.	8 " 15 m.
gallæ fl.	¾ " 2 fl. d.
gelsemii	2 " 8 m.
gelsemii fl.	5 " 20 "
gent. fl.	30 " 60 "
gent. comp. fl.	30 " 60 "
gent. quinque fl.	15 " 30 "
geranii fl.	15 " 30 "
gei fl.	15 " 30 "
gilleniæ fl.	15 " 30 "
gossypii fl.	15 " 45 "
granati rad. cort. fl.	¾ " 2 fl. d.
grind. rob. fl.	30 " 60 m.
grind. squarr. fl.	30 " 60 "
guaiaci ligni fl.	30 " 60 "
guaranæ fl.	15 " 30 "
hæmatoxyli	8 " 30 g.
hæmatoxyli fl.	30 " 60 m.
hamamelid. fl.	30 " 90 "
helleb. nigris	½ " 3 g.
helleb. nigris fl.	5 " 15 m.
heloniæ fl.	8 " 30 "
hepaticæ fl.	30 " 60 "
humuli	3 " 15 g.
humuli fl.	30 " 60 m.
hydrangeæ fl.	30 " 60 "
hydrastis	3 " 10 g.
hydrastis fl.	8 " 30 m.
hyoscyami (Eng.)	1 " 4 g.
hyoscyami alc.	1 " 2 "
hyoscyami fol. fl.	3 " 15 m.
hyoscyami sem. fl.	2 " 8 "
ignatiæ	¼ " ½ g.
ignatiæ fl.	1 " 6 m.
ipecac fl.	3 " 60 "
iridis versicol.	3 " 6 g.
iridis versicol. fl.	15 " 30 m.
jaborandi fl..	10 " 60 "
jalapæ; U.S.P., 1870	5 " 10 g.
jalapæ alc.	3 " 6 "
jalapæ fl..	15 " 30 m.
juglandis.	15 " 30 g.
juglandis fl..	¾ " 2 fl. d.
junip. fl.	30 " 60 m.

Remedies.	Dose.
Extr. kamala fl.	30 to 60 m.
kino, liquid	15 " 30 "
krameriæ	5 " 15 g.
krameriæ fl.	30 " 60 m.
lactucæ	5 " 15 g.
lactucæ fl.	15 " 60 m.
lactucarii fl.	8 " 30 "
lappæ fl.	1 " 2 fl. d.
laricis fl.	½ " 2 "
leonuri fl.	30 " 60 m.
leptandræ	3 " 10 g.
leptandræ fl.	30 " 60 m.
lobeliæ fl.	1 " 5 "
lupuli fl	5 " 15 "
lycopi fl.	5 " 30 "
milta	1 " 2½ d.
manzanitæ fl.	½ " 2 fl. d.
marrubii fl.	1 " 2 "
matico fl.	30 " 60 m.
matricariæ	8 " 30 "
menispermi fl.	30 " 60 "
methystice fl.	15 " 60 "
mezerei	½ " 1 g.
mezerei fl.	3 " 10 m.
micromeriæ	15 " 60 "
mitchellæ fl.	30 " 60 "
myricæ fl.	30 " 60 "
nectandræ	1 " 4 fl. d.
nuc. vom.	⅛ " ½ g.
nuc. vom. fl.	1 " 5 m.
nuphar fl.	5 " 15 "
nymphææ fl.	5 " 15 "
œnotheræ fl.	15 " 30 "
opii	⅙ " ½ g.
papaveris	½ " 2 "
papaveris fl.	15 " 45 m.
pareiræ fl.	30 " 60 "
petroselina fl.	1 " 2 fl. d.
phellandrii fl.	1 " 2 "
phoradendri fl.	½ " 1 "
physostigmæ	1/16 " ⅙ g.
physostigmæ fl.	1 " 3 m.
phytolaccæ baccar fl.	5 " 30 "
phytolaccæ rad.	1 " 3 g.
phytolaccæ rad. fl.	5 " 30 m.
pilocarpi fl.	15 " 60 "
pimentæ fl.	15 " 45 "
piper. nig. fl.	15 " 45 "
piscidiæ fl.	15 " 60 "
podophylli	½ " 1½ g.
podophylli fl.	8 " 30 m.
polygoni fl.	15 " 30 "
polygonati fl.	5 " 15 "
populi fl.	30 " 60 "
prinos fl.	30 " 60 "
prun. virg. fl.	30 " 60 "
pteleæ	15 " 30 "
pulsatillæ fl.	2 " 5 "
quassiæ	1 " 5 g.
quassiæ fl.	30 " 60 m.

Remedies.	Dose.
Extr. quebracho fl.	20 to 60 m.
quercus fl.	30 " 60 "
rhamni cath. ft. fl.	30 " 60 "
rhamni pur. cort. fl.	30 " 120 "
rhei	5 " 10 g.
rhei fl.	15 " 45 m.
rhois arom. fl.	15 " 60 "
rhois glabr. cort fl.	30 " 60 "
rhois glabr. fruct. fl.	30 " 60 "
rhois toxicod. fl.	1 " 6 "
ricini fol. fl.	½ " 2 fl. d.
rosæ fl.	½ " 2 "
rubi fl.	15 " 60 m.
rumicis fl.	30 " 60 "
rutæ fl.	15 " 30 "
sabbatiæ fl.	30 " 60 "
sabinæ fl.	5 " 15 "
salicis fl.	½ " 2 fl. d.
salviæ fl.	½ " 2 "
sambuci fl.	½ " 2 "
sanguin. fl.	5 " 15 m.
santali citr.	1 " 2 fl. d.
santonicæ fl.	15 " 60 m.
sarsap. fl.	½ " 2 fl. d.
sarsap. comp. fl.	½ " 2 "
sassafras fl.	½ " 2 "
scillæ fl.	5 " 30 m.
scillæ comp. fl.	5 " 30 "
scoparii fl.	½ " 1 fl. d.
scutellariæ fl.	½ " 2 "
senecionis fl.	1 " 2 fl. d.
senegæ fl.	8 " 15 m.
sennæ fl.	1 " 4 fl. d.
serpent. fl.	30 " 60 m.
simarubæ fl.	15 " 30 "
solidag. fl.	30 " 60 "
spigeliæ fl.	15 " 60 "
spigeliæ et sennæ fl.	½ " 2 fl. d.
stillingiæ fl.	½ " 2 "
stillingiæ comp. fl.	½ " 2 "
stramonii (Eng.)	½ " 1 g.
stramonii fol. alc.	⅓ " ⅔ "
stramonii sem.	⅙ " ½ "
stramonii fl.	1 " 6 m.
sumbul fl.	15 " 60 "
taraxaci	5 " 15 g.
taraxaci fl.	½ " 2 fl. d.
thujæ fl.	8 " 15 m.
toxicodendri fl.	1 " 5 "
trifol. prat. fl.	1 " 2 fl. d.
trillii fl.	½ " 2 "
trit. rep. fl.	1 " 4 fl. d.
tussilag. fl.	30 " 60 m.
urticæ rad. fl.	5 " 15 "
ustilag. maid. fl.	15 " 60 "
uvæ ursi fl.	30 " 60 "
vaccin. crassifol. fl.	30 " 60 "
valerian	5 " 15 g.
valer. fl.	30 " 60 m.
veratr. vir. fl.	2 " 8 "

Remedies.	Dose.			
Extr. verbenæ	15	to	60	m.
viburni opuli fl.	1	"	2	fl. d.
viburni[prunifol.]fl.	1	"	2	"
wahoo	1	"	5	g.
xanthoxyli cort. fl.	15	"	30	m.
xanthoxyli fruct. fl.	15	"	30	"
zingiberis fl.	8	"	30	"
Fel bovis purif.	3	"	6	g.
Ferri arsen.	1/20	"	1/2	"
benzoas	1	"	5	"
bromid.	1	"	5	"
carb. sacch.	4	"	15	"
chlorid.	1	"	3	"
citr.	5	"	10	"
et ammon. citr.	5	"	10	"
et ammon. sulph.	5	"	10	"
et ammon. tartr.	5	"	15	"
et cinchonid. citr.	5	"	10	"
et pot. tartr.	15	"	60	"
et quin. citr.	5	"	10	"
et strychn. citr.	1	"	5	"
hypophosphis	5	"	10	"
iodidum	1	"	5	"
iodidum sacch.	2	"	3	"
lactas	1	"	3	"
oxalas	1	"	3	"
oxid. magnet.	5	"	10	"
oxid. hydrat.	1/2	"	2	oz.
phosphas	1	"	5	g.
pyrophosphas	1	"	5	"
subcarb.	5	"	30	"
sulphas	1	"	3	"
sulphas exsiccat.	1/2	"	1 1/2	"
valer.	1	"	3	"
Ferrum dialys.	1	"	15	m.
redact.	1	"	5	g.
Gamboge	1	"	4	"
Gaultheria, oil of	—		10	m.
Guarana	8	"	30	g.
Helloborein	1/10	"	1/4	"
Hydrarg. chlor. corros.	1/64	"	1/10	"
chlor. mite	1/6	"	8	"
iodid. flav.	1/6	"	1	"
iodid. rubr	1/50	"	1/16	"
iodid. vir.	1/6	"	1	"
subsulphas flav.	1/4	"	1/2	"
c. creta	3	"	8	"
Hydrastin	5	"	10	"
Hyoscine	1/100	"	1/70	"
Hyoscyamina & salts	1/135	"	1/32	g.
Hypnone	—		1	m.
Ichthyol	3	"	4	g.
Infusum brayeræ	2	"	8	fl. oz.
digitalis	2	"	4	fl. d.
sennæ comp.	1	"	2	fl. oz.
Iodoformum	1	"	3	g.
Iodol.	1/6	"	1/2	"
Iodum	1/10	"	1/4	"
Ipecacuanha expect.	1/6	"	1	"
Ipecacuanha emet.	15	"	30	"

Remedies.	Dose.			
Jalapa	15	to	30	g.
Kairin	—		8	"
Kamala	1	"	2	d.
Kino	8	"	30	g.
Lactucarium	8	"	15	"
Lewinin	50	per cent. sol.		
Liq. ammon. acet.	2	to	8	fl. d.
acidi arseniosi	2	"	7	m.
arsen. et hydr. iod.	2	"	7	"
ferri chloridi	2	"	10	"
ferri dialys.	1	"	15	"
ferri nitrat.	8	"	15	"
pepsini	2	"	4	fl. d.
Liquor potassæ	5	"	30	m.
potassii arsenit.	3	"	7	"
potassii citrat	2	"	4	fl. d.
sodæ	5	"	30	m.
sodii arseniatis	3	"	7	"
Lithii benzoas.	2	"	5	g.
bromid	1	"	3	"
carb.	2	"	6	"
citr.	2	"	5	"
salicylas	2	"	8	"
Lupulinum	5	"	10	"
Magnesia	15	"	60	"
Magnesii carb.	15	"	60	"
Magnesii citr. gran.	2	"	8	d.
sulphas	2	"	8	"
sulphis	8	"	30	g.
Manganese binox.	2	"	4	"
Mangani sulphas	2	"	10	g.
Manna	1	"	2	oz.
Massa copaibæ	5	"	30	g.
ferri carb.	5	"	15	"
hydrarg.	1	"	15	"
Mist. ammoniaci	4	"	8	fl. d.
asafœtidæ	4	"	8	"
chloroformi.	1	"	2	"
cretæ.	1	"	2	fl. oz.
ferri comp.	1/2	"	2	"
ferri et. amm. acet.	1/2	"	1	"
glycyrrh. comp.	1	"	4	fl. d.
magnes. et asafœt.	1	"	4	"
potassii citr.	1/2	"	2	fl. oz.
rhei et sodæ	1/2	"	1	"
Morphina and it salts	1/16	"	1/2	g.
Moschuol	1	"	5	"
Moschus	2	"	15	"
Naphtholinum	2	"	10	"
Naphthol	2	"	5	"
Narceina	1/6	"	1/2	g.
Nitroglycerinum	1	d. of	1	p. c. sol
Nux vomica	1	"	5	g.
Oleoresina aspidii	15	"	60	"
capsici	1/6	"	1/2	"
cubebæ	5	"	20	m.
Oleoresina filicis	30	"	60	"
lupulini	2	"	5	g.
piperis	1	"	3	"
zingiberis	1	"	3	"

Remedies.	Dose.			
Oleum copaibæ	8	to	15	m.
cubebæ	15	"	30	"
eriger.	5	"	15	"
eucalypti	5	"	10	"
gaultheriæ	1	"	20	m.
phosphoratum	1	"	3	"
sabinæ	1	"	3	"
terebinth	5	"	30	"
tiglii	1/6	"	1½	d.
Opium (14% morphine)	1/6	"	1½	g.
Pancreatin	10	"	20	"
Papayotin	1	"	5	"
Paracotin	1	"	3	"
Paraldehyde	20	"	60	"
Pelleterine.	5	"	10	"
Pepsinum purum	15 g.	to	½	oz.
saccharatum	30 g.	to	1	oz.
Phenacetine	2	"	6	"
Phosphorus	1/128	to	1/30	g.
Physostigminæ salic.	1/120	"	1/64	"
sulphas	1/128	"	1/64	"
Picrotoxinum	1/64	"	1/8	"
Pilocarpine, and salts	1/64	"	½	"
Pil. aloes	1	"	3	pills.
aloes et asafœt.	2	"	5	"
aloes et ferri	1	"	3	"
aloes et mast.	1	"	3	"
aloes et myrrhæ	2	"	5	"
antim. comp.	1	"	3	"
asafœtidæ	1	"	6	"
cathart. comp.	1	"	4	"
ferri comp.	2	"	5	"
ferri iodidi	1	"	4	"
galbani comp.	1	"	5	"
opii	1	"	2	"
phosphori	1	"	4	"
rhei	2	"	5	"
rhei comp.	2	"	5	"
Piperinum	1	"	8	g.
Plumbi acetas	½	"	3	"
iodidum	½	"	3	"
Potassii acetas	15	"	60	"
bicarb.	8	"	60	"
bitartr.	1	"	2	"
bromid.	8	"	60	"
carb.	8	"	30	"
chloras	8	"	30	"
citras	15	"	60	"
cyanid.	1/16	"	1/8	"
et sodii tartr.	½	"	1	oz.
hypophosphis	5	"	15	g.
iodid.	2	"	15	"
nitras	8	"	15	"
sulphas	1	"	4	d.
sulphidum	1	"	10	g.
sulphis	15	"	30	"
tartras	1	"	8	d.
Pulv. antimonialis	1	"	3	g.
aromat.	8	"	30	"
cretæ comp.	8	"	30	"

Remedies.	Dose.			
Pulv. glycyrrh. comp.	30	to	60	g.
ipecac. comp.	5	"	15	"
jalapæ comp.	30	"	60	"
morphinæ comp.	8	"	15	"
rhei comp.	30	"	60	"
Pyridine	1	"	5	"
Pyrodine	1	"	3	"
Quinidina (and salts)	1	"	30	"
Quinina (and salts)	1	"	30	"
Quininæ arsenias	1/6	"	1	"
Resina copaibæ	2	"	10	"
guiaici	10	"	20	"
jalapæ	2	"	5	"
podophylli	1/8	"	½	"
scammonii	2	"	10	"
Resorcin	2	"	5	"
Rheum	2	"	30	"
Saccharin	½	"	4	"
Salicinum	8	"	30	"
Salol	10	"	15	"
Santonica	8	"	60	"
Santoninum	1	"	5	"
Sapo	5	"	30	"
Scammonium	3	"	15	"
Senna	8	"	60	"
Sodii acetas	15	"	60	"
arsenias	1/64	"	1/16	"
benzoas	5	"	15	"
bicarb.	8	"	30	"
bisulphis	8	"	30	"
boras.	8	"	30	"
bromid.	8	"	30	"
carb.	8	"	30	"
carb. exsicc.	5	"	15	"
chloras.	5	"	30	"
hypophosphis	8	"	15	"
hyposulphis	8	"	30	"
iodidum	5	"	15	"
phosphas	2	"	15	"
salicylas	5	"	30	"
santoninas	2	"	10	"
sulphas	1	"	2	"
sulphis	8	"	30	"
Sparteine sulph	½	"	4	"
Spiritus ætheris compositus	30	"	60	m.
æther. nitrosi	½	"	2	fl. d.
ammoniæ	8	"	30	m.
ammoniæ arom.	15	"	60	"
camphoræ	8	"	30	"
chloroformi	15	"	60	"
lavend. comp.	30	"	60	"
menth. pip.	30	"	60	"
Strophanthin	1/160	"	1/100	"
Strychnine, and salts	1/64	"	1/12	g.
Sulphur	½	"	4	d.
Syr. calcii lactophos	1	"	2	fl. d.
calcis	15	"	30	m.
ferri bromidi	15	"	60	"
ferri iodidi	15	"	40	"

Remedies.	Dose.			
Syr. ferri oxidi			1	fl. d.
ferri hypophosph.			1	"
ferri quin et str. phos.			1	"
hypophosphit			1	"
hypophosph. c. fer.			1	"
ipecac.	½	"	1	"
krameriæ	½	"	4	"
lactucarii	1	"	3	"
rhei	1	"	4	"
rhei arom.	1	"	4	"
rosæ	1	"	2	"
sarsap. comp.	1	"	4	"
scillæ	½	"	1	"
scillæ comp.	15	"	60	m.
senegæ	1	"	2	fl. d.
sennæ	1	"	4	"
Terebene	5	"	10	"
Terpine hydrate	10	"	20	"
Thallin			3	g.
Theine	1	g. hypo.		
Thymol	1	"	5	"
Tinct. aconiti fol.	8	"	16	m.
aconiti rad.	1	"	5	"
acon.rad.Fleming's	⅔	"	2½	"
aloes (1880)	½	"	2	fl. d.
aloes et myrrhæ	1	"	2	"
arnicæ flor.	8	"	30	m.
arnicæ rad.	15	"	30	"
asafœtidæ	30	"	60	"
belladonnæ	8	"	15	"
bryoniæ	15	"	30	"
calendulæ	15	"	30	"
calumbæ	1	"	4	fl. d.
cannabis ind.	15	"	30	m.
cantharid.	8	"	15	"
capsici	8	"	15	"
catechu comp.	½	"	2	fl. d.
chiretta	15	"	60	m.
cimicifugæ	30	"	60	"
cinchonæ	½	"	2	fl. d.
cinchonæ comp.	½	"	2	"
colchici rad.	5	"	15	m.
colchici sem.	6	"	15	"
conii	5	"	30	"
croci	1	"	2	fl. d.
cubebæ	1	"	2	"
digitalis	6	"	15	m.
ferri acet.	15	"	30	"
ferri chloridi	15	"	30	"
ferri chloridi æther	15	"	30	"
ferri pomati	20	"	60	"
gallæ	½	"	2	fl. d.
gelsemii	8	"	15	m.
guaiaci	30	"	60	"
guaiaci ammon.	30	"	60	"
hellebori	10	"	15	"
humuli	1	"	2½	fl. d.

Remedies.	Dose.			
Tinct. hydrastis.	30	to	90	m.
hyoscyami fol.	15	"	30	"
hyoscyami sem.	15	"	30	"
ignatiæ	5	"	15	"
iodi	5	"	15	"
ipecac. et opii	5	"	15	"
jalapæ	½	"	2	fl d.
kino	½	"	2	"
krameriæ	½	"	2	"
lavend. comp.	½	"	2	"
lobeliæ	15	"	45	m.
lupulini	½	"	2	fl. d.
matico	½	"	2	"
moschi	15	"	60	m.
nux vomicæ	8	"	20	"
opii	8	"	15	"
opii camph.	8	"	75	"
phytolaccæ	8	"	60	"
physostigmatis	5	"	15	"
pyrethri	8	"	30	"
quassiæ	½	"	2	fl. d
rhei	1	"	8	"
rhei arom.	30	"	75	m.
rhei dulc.	1	"	4	fl. d.
sanguinariæ	15	"	70	m.
scillæ	8	"	60	"
serpentariæ	½	"	2	fl. d.
stramon. fol.	8	"	15	m.
stramon sem.	6	"	15	"
sumbul	8	"	30	"
valer	½	"	2	fl. d.
valer. ammon.	¼	"	2	"
veratr. vir.	3	"	10	m.
zingiberis	15	"	60	"
Tritur. elaterina	⅛	"	½	g.
Urethan	10	"	15	"
Veratrina	$\frac{1}{64}$	"	$\frac{1}{10}$	"
Vin. aloes	1	"	2	fl. d.
antim. exp.et alt.	1	"	8	m.
antim. emet.	30	"	75	"
colch. rad.	8	"	20	"
colch. sem.	5	"	30	"
ergotæ	1	"	3	fl. d.
ferri amar.			1	"
ferri citrat			1	"
ipecac. expect.	5	"	15	m.
ipecac. emet.	3	"	6	fl. d.
opii	5	"	15	m.
rhei	1	"	2	fl. d.
Zinci acet.	1	"	2	g.
bromid.	½	"	2	"
iodid.	½	"	3	"
oxid.	1	"	10	"
phosphid.	$\frac{1}{10}$	"	⅛	"
sulphas emet.	15	"	30	"
valerianas	1	"	6	"

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EMPYEMA.

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GOITRE. (See BRONCHOCELE.)

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Elaterium or jalap, useful to remove effusion, 149, 509
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Ice-poultice or jacket, used with success in sthenic cases, 306
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Antimony, should only be used in sthenic cases, 513

Antipyrine, of great value if fever is excessive, 61

Blisters applied to one side of congested spot, in first stage; immediately over spot in stage of resolution, 518

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Cayenne pepper, a valuable counter-irritant, 514

Chloral, not advisable, 513

Cups, dry and wet, in first stage; also in secondary attack superimposed on first, 514, 518

Digitalis, tincture, gtt. 5, every four hours, accompanied by strychnine, gr. 1-20, carefully watched, in second stage, 514

Expectorants must be stopped, if secondary attack is superimposed on first, 518

Gelsemium, not advisable, 513

Ice-poultice or jacket highly recommended, in first stage of sthenic cases, 306, 514

Leeching, bleeding, cupping or cardiac sedatives, in sthenic cases, if secondary attack superimposed on first, 518

Mustard plaster to chest in first stage; to feet, in secondary attack superimposed on first, 518

Oxygen inhalations, if asphyxia threatens, 519

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Pilocarpine, hypodermically, only to be used in earliest stage, 513

Poultices, useful in second and third stage, 519

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Quinine, gr. 2, thrice daily, in suppository, in lobar pneumonia of children, 128

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Venesection, in early stage of sthenic cases, cardiac depressants preferable, 327, 517

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PLEURODYNIA. (See NEURALGIA.)

POISONING FROM

Acetanilide.

Supportive measures, stimulants, external heat, belladonna to maintain blood pressure, strychnine to counteract respiratory failure, and oxygen inhalations to overcome cyanosis, 32

Acetate of Zinc.

Treatment same as for gastro-enteritis, 34

Acetic Acid.

Large amounts of milk, alkaline liquids, and general treatment for gastro-enteritis, 34

Aconite.

Keep patient in prone position with feet higher than head. Hot applications; emetics contra-indicated; evacuate stomach by siphon or stomach-pump. Ether hypodermically, followed by alcohol and this by digitalis. Artificial respiration and amyl nitrite, a few whiffs, no more, if heart fails,

Alcohol, Acute.

External heat and digitalis hypodermically, in coma, if heart fails. Belladonna, if skin is relaxed and clammy, and counter-irritation to nape of neck, for brain symptoms. After-treatment, ammonia, spices, spirit of Mindererus; emollients in gastritis. Ice, aconite, or ipecac. in minute dose, and counter-irritation for vomiting. Jalap, gr. 40, elaterium, gr. 1-6, or calomel and salines, as purgatives, 39

Alcohol, Chronic.

Withdrawal of drug, at once or gradually. Highly seasoned broths, predigested foods, and morphine or coca, in small dose, if weakness is marked. Capsicum prescriptions (pages 41, 99), 41

Antimony.

Large doses of tannic acid, external heat, alcohol, digitalis, and opium hypodermically, if respiration is not too feeble. Prone position, the patient vomiting into towels. Stomach-pump, if vomiting is absent, 57

Antipyrine.

Maintain bodily heat, stimulants, atropine, and oxygen inhalations, if cyanosis is alarming, 61

Arsenic, Acute and Chronic.

Stomach-pump, external heat, stimulants, and the chemical antidote, hydrated sesquioxide of iron and magnesia. Magnesia also useful by itself. Opium should follow antidote to allay pain, and large draughts of water to flush kidneys and dilute poison. For chronic poisoning, iodide of potassium, tonics, electricity, and out-of-door life, 70, 71

Carbolic Acid.

Soluble sulphates, as Epsom or Glauber salts, warm mucilgainous drinks, hot applications to extremities, digitalis, strychnine, and counter-irritation over abdomen. Emetics and stomach-pump should be used if possible, 103

Carbon Disulphide.

Potassium bromide and chloral, if convulsive disorders exist, and circulatory stimulants if failure threatens, 105

Chloral.

External heat, emetics in early and stomach-pump in later stages. Strychnine or atropine to stimulate respiration. Digitalis preceded by ether, ammonia, brandy, or whiskey. Prone position, feet being elevated, 113

Chloroform.

Artificial respiration, ether hypodermically, and hot brandy. Poles of battery with rapidly interrupted current swept over body, not over diaphragm or phrenic nerve. Place patient with head downward. Atropine, strychnine, and digitalis to stimulate heart and respiration, 121

Colchicum.

Tannic acid, emetics, and stomach-pump. Opium to relieve pain and oils to soothe inflamed mucous membranes. Atropine and stimulants if collapse comes on, 138

Conium.

Emetics or stomach-pump, strychnine as a nervous and respiratory stimulant, external heat and cardiac stimulants, if circulation fails, 141

Copper.

Yellow prussiate of potassium, sweet oil, white of eggs: followed instantly by emetics or stomach-pump. If emesis or purgation is present emetics are contra-indicated, and mustard plaster over abdomen and opium internally, are to be employed, 142

Croton Oil.

Treatment same as gastro-enteritis, 144

Digitalis.

Tannic acid as a chemical antidote, emetics or stomach-pump, external heat to abdomen and aconite as a physiological antidote. Maintain horizontal position, 148

Elaterium.

Treatment same as gastro-enteritis, 150

Ether.

Artificial respiration, place body with head downward if face is pale, strychnine hypodermically, atropine, digitalis, or intravenous injection of ammonia, frictions and hot applications, 124

Gelsemium.

Emetics and stomach-pump, digitalis, atropine, and ammonia as cardiac stimulants, external heat, strychnine, and atropine for respiratory centre, 161

Iodine.

Emetics or stomach-pump, large amounts of starch, hot applications, and hypodermic injections of alcohol, ammonia, atropine, digitalis, or strychnine, 185

Lead, Acute.

Epsom or Glauber salts, in large amounts, emetics or stomach-pump, if vomiting produced by the drug has not rid stomach of all poison. Hot applications and opium to relieve pain, 198

Lead, Chronic.

Jalap and calomel with opium, and alum, gr. 2, with opium or morphine, in full dose, valuable in lead colic. Blister to back of neck, revulsives and pilocarpine in cerebral inflammation. Iodide of potassium to eliminate lead. Strychnine in progressive paralysis. Electricity and baths of sulphurets of potassium, to restore lost function, 199

Mineral Acids.

Alkalies, such as magnesium, lime, white-wash, soap, white of egg, external heat, oils and opium, to relieve irritation, 171, 225, 227, 280

Monsel's Solution.

Soap, 179

Nitrate of Silver, Acute.

Common salt as the chemical antidote, opium and oils to allay irritation, large amounts of milk, soap, and water, 222

Nitrate of Silver, Chronic.

Iodide of potassium, to aid in eliminating poison, 222

Nux Vomica and Alkaloids.

Inhalations of amyl nitrite, to prevent convulsive tendencies, at the same time use stomach-pump. Tannic acid followed by physiological antidotes, potassium bromide, gr. 60, with chloral, gr. 20. If convulsions prevent swallowing, chloroform patient carefully and give antidotes by rectum in starch-water. Amyl nitrite, hypodermically, if relaxation does not occur, 229

Opium, Acute.

Emetics or stomach-pump, tannic acid, black coffee, electricity, and other measures to keep patient awake. Atropine, hypodermically, if respiration fails. Alcohol, ammonia, and external heat. Artificial respiration may be necessary, 233

Opium, Chronic.

Decrease a sixth or fourth of customary amount each twenty-four hours. Cocaine not advisable, as the cocaine-habit may be established. Digitalis if heart fails, 234

Phosphorus.

Sulphate of copper as the chemical antidote, acts as an emetic if given in excess, 248

Physostigma.

Atropine as a physiological antidote, external heat, and cardiac and respiratory stimulants, 250

Scammony.

Treatment same as for gastro-enteritis,

Tobacco.

Strychnine, cardiac stimulants, external heat, and atropine, 287

Veratrum Viride.

Prone position, head higher than feet, atropine, strychnine, external heat, and cardiac stimulants, 293

POST-PARTUM HÆMORRHAGE, 461, 527

Auto-transfusion, or actual transfusion of weak salt solution, necessary in some cases, 528
Beef-tea, ½ pint, and morphine, gr. ⅛ hypodermically, after reaction is established, 528
Enema, of hot water, 1 pint, after cessation of bleeding, 528
Ergot, as a cure and prophylactic, 151
Ether, hypodermically, if symptoms of shock are manifested, 528
Hirst's method of controlling, 527
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PROSTATITIS, 446

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Local treatment to prostatic urethra, and use of cold steel-sounds in chronic types, 447
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Rest in bed, regulation of bowels, leeches to perineum, medication to render urine alkaline, and morphine hypodermically or in suppository, 446
Soft catheter, allowed to remain in bladder, if retention of urine is persistent, 446

PROSTATORRHŒA.

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PRURIGO.

Cantharides, 98

PRURITUS, 519

Alum solution as a wash in pruritus vulvæ, 47
Arsenic, quinine, bitter tonics, cod-liver oil, alkaline diuretics or mineral waters in debility and avoidance of condiments, if mouth of vagina or urethra is affected, 520
Calomel and lard (1 drachm to the ounce), locally applied, 213
Cocaine, relieves temporarily, 520
Cold douche and injections highly recommended in pruritus ani and vulvæ, 311, 312
Goulard's extract, dilute, useful in pruritus pudendi, 200
Hydrocyanic acid, locally applied, prescription for, 173
Prescription for lotions and ointments, 520
Salicylic acid, prescription for, 260
Silver nitrate (gr. 20 to the ounce), locally applied, preceded by cocaine, if itching is intense; a 4 to 6-grain solution may relieve itching of pruritus pudendi, ani and vulvæ, 224, 520
Sodium bicarbonate or borax (1 drachm to the pint) as a wash, relieves temporarily, 520
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PSORIASIS.

Anthrarobin, 55
Aristol, 65
Arsenic, 68
Baths of sulphides, very useful, 276
Chrysarobin, gr. ⅛ internally, or the ointment with benzoated lard (1 to 4 or 5) locally applied, face excepted, 124
Gallic acid ointment, 159
Resorcin, prescription for, 254
Tar, locally applied, 251

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Alum, applied on swab, in mercurial ptyalism, 47
Belladonna, in idiopathic or mercurial types, 75

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For treatment, see special titles.

PUERPERAL FEVER, 521

Antipyretics, best abstained from as long as possible, 522
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Boric acid, creolin (2 per cent.), or bichloride (1 to 8000) solutions as injections into bladder, to prevent septic cystitis, 524
Curette or placental forceps, to remove membranes if fever continues after antiseptic injections, 521
Epsom salts, concentrated solution, 2 drachms every fifteen minutes, if peritonitis develops, 523
Laparotomy, occasionally saves life, if septic peritonitis develops, 522
Nutriment in large amounts and alcoholic stimulants, if symptoms of systemic invasion arise, 522
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Cantharides, 98
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Juniper, as a tonic in chronic types, 195
Uva ursi, 290

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Salicylic acid, gr. 3 hourly, acts as a specific, especially if due to rheumatism, 260

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Eupatorium. 158
Monsel's salt, or gallic or tannic acid, if intestinal hæmorrhage occurs, 533
Morphine, spirit of chloroform, or aconite in sthenic cases, to control vomiting, 533
Quinine, gr. 20 to 30, preceded by calomel, gr. 3 to 4, if not retained, administer by rectum, or hypodermically, with divided doses of Seidlitz powder, by mouth, 532
Tonics, potassium salts, to regulate kidneys, and purgatives, if necessary, during convalescence, 533
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Aconite, or veratrum viride, useful at onset of inflammation in sthenic cases, 533, 534
Alcohol, in depression, 534
Ammonium bromide, 51
Antipyrine, gr. 10 to 20, or antifebrin, gr. 4 to 8, often very valuable, 535
Benzoic acid, drachm 2 to 3, daily, said to be a specific, 77
Bicarbonate or citrate of potassium, gr. 20, in water, every five hours, in obstinate cases, 536
Blisters over joints, useful after systemic disturbance is past, 537
Camphor liniment, 94
Capsicum plaster, 100
Cimicifuga, shortens attack and relieves pain in some cases, 536
Cold pack, if fever threatens life, 314
Ice-cold compress, may relieve inflamed joints, 534
Iodine, ointment or tincture, painted over parts, 537
Ichthyol ointment, valuable applied to joints, prescription for, 537
Lemon or lime juice, or citric acid, beneficial in nearly all cases, 131, 536
Oil of gaultheria, useful, as a substitute for salicylic acid, 536
Potassium iodide, useful in subacute or obstinate types, prescription for, 536
Potassium nitrate, 221
Rhus toxicodendron, especially useful for night pains, 536
Salicylic acid, gr. 20, thrice daily, if untoward symptoms arise must be stopped, 534
Sodium bicarbonate (gr. 20 to the ounce), applied on lint to inflamed joints, 534
Salol, useful as a substitute for salicylic acid, dangerous in large doses, 537
Sulphur, 279
Veratrine ointment, useful locally applied to joints, 537

RHEUMATISM, CHRONIC.

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